

PERSONAL

COMPUTER

NEWS

50p

Jan 7, 1984

No 43

BRITAIN'S BIGGEST WEEKLY

BBC TOUCHLINE
The typing tutor that gets fast with qwerty

SPECTRUM SUITE
Assembler, editor & monitor in one new package

TEST PLAY...
... new games for the Dragon, 64, Spectrum & Genie

ORIC EXTRA
We pick up the tabs...



!FREE INSIDE!
Your guide to the Electron

SHOULD WE WAIT FOR IBM'S JUNIOR?

**Pull-out and keep
Micropaedia**

First of a three-part in-depth look at Acorn's Electron. This week, inside the machine, electron history and a first look at the Electron's BBC Basic.

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by Michael O'Brian

PCN HARDWARE

IBM Junior

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With massive publicity, the PCJr, code-named Peanut, has been unveiled in America to not totally rapturous applause. Ian Scales looks at Big Blue's latest progeny and assesses whether or not it will make waves in the UK.

PCN SPECIALS



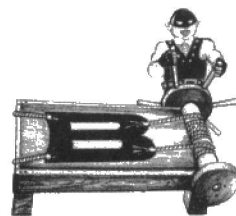
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There may be place for an interface in our overdeveloped computerspeak, but integrated solutions, acronyms and 'problems' are definitely out of vogue, says David Guest. (And any idea what COD or SSSS could mean?)

Weighty Spectrum

Keep up with Kevin Ball's series on souping up Spectrum characters. Here's how to get double-width letters.



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Tabs on Oric

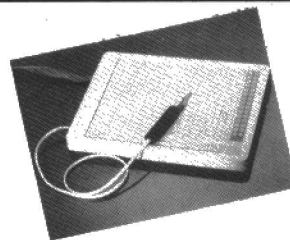
If you've had presentation problems, this series of programs might solve them.

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BBC Artist

The British Micro Grafpad at under £150, brings screen art into the home user's range. Richard Gold tested his talent on this new graphics pad.



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Less Pricey Printer

At £240, the Walters WM80 is an attractive prospect. But does saving money mean losing facilities? Roger Howorth investigates.

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BBC Tutor

For all one-fingered typists . . . here's a package that'll zap up the keys by teaching you to type. Colin Cohen reports.



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Dragon rumpus

By David Guest

Dragon Data faces a revolt by its users over the terms of its 32 to 64 trade-in.

'Ridiculous' was how one Dragon 32 owner described it. 'I can't see many people being too keen,' said Paul Kennedy, the organiser of a Dragon owners' club. What they are both objecting to is the £85 valuation that Dragon has put on the 32, leaving users to find £140 to move up to the 64.

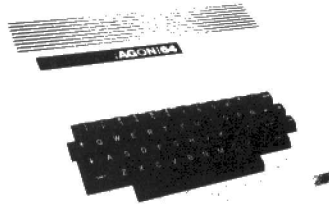
'At the moment you could probably expect to get £110 or £120 for a 32,' said one owner. 'Not only that, but when you're buying a new system you can normally get a discount somewhere.'

The trade-in deal was unveiled to users just before Christmas; Dragon's Richard Wadman said: 'We have already had some indication that it will be accepted, but we don't expect much feedback until January.'

**The Dragon 64 —
focus of users' discontent
over trade-in terms.**

The transition from the 32 to the £225 64 has been a thorny subject ever since the 64 appeared on the horizon. In the last few months of 1983 it became clear that Dragon planned a trade-in rather than an upgrade for people wanting to move to the bigger machine, but at the same time it maintained compatibility in the 64 with many of the 32's features.

Mr Kennedy commented: 'I



think that in order to keep compatibility they may have sacrificed a lot of potential customers — it is a missed opportunity to enhance the graphics and sound of the 32.' This echoes a common view.

If Dragon 32 users do choose to ignore the trade-in they could effectively extend the life-expectancy of the machine, which otherwise might have begun to fade from the scene later this year.

Memotech disks due

By Wendie Pearson

Memotech's long-awaited disk drives for the MTX 500 should be released at the end of this month.

Originally planned for release in October, one month after the micro's launch, the drives have apparently been held up because of heavy demand for the MTX 500, priced at £275.

The disk drives come in two versions — a double floppy unit storing 500K per drive on 5¼in disks will be £870, giving a total 1Mb of storage, and enabling the machine to run CP/M.

The second version at £995 consists of a single floppy 500K 5¼in drive, and instead of a second drive you get a 256K silicon disk, which is formatted like a disk, and, according to Memotech, is faster than a Winchester.

The company also plans a Winchester drive with up to 32Mb of storage, due out in about six months. A price is not yet fixed.

Winners score a Spectrum

1984 starts well for 20 readers who have each won a 48K Spectrum in our eight-part Micropaedia competition. Congratulations to:

Brian Battye, of Feltham, Middlesex; G Coombs, of Market Deeping, Peterborough; Anna Smith, of London; Brian Shearer, of West Lothian, Scotland; Duncan Williams, of Abingdon, Oxon; R S Holmes, of Breightmet, Bolton; Anthony Breeds, of Eastbourne, East Sussex; Dorothy Leddy, of Linlithgow, West Lothian, Scotland; M D Goddard, of Dereham, Norfolk; A W A Ewence, of Bradford-on-Avon, Wiltshire; Michael Glickman, of Glasgow;

Anthony Wood, of Haslingfield, Cambridge; David Hambly, of Hainault, Ilford, Essex; Nigel Mellor, of Oakes, Huddersfield, W Yorkshire; G A W Storer, of Warmley, Bristol; Hin Keung Ling, of Liverpool, Merseyside; Ian Garner, of Shephed, Loughborough, Leicestershire; David Parkes, of Warley, W Midlands; John A Bell, of Quarndon, Derbyshire; David Ratcliffe, of Narborough, Leicestershire.

Commiseration to all unlucky entrants, but we'll be publishing many more competitions for you to try again. The correct answers to the Micropaedia competition were: 1, 6502; 2, Beginners' All-purpose Symbolic Instruction Code; 3, Numeric and string; 4, £960; 5, Charles H Moore; 6, 1976; 7, Wumpus; 8, First In First Out.

Queen's gift to India — Acorn's second processors

By Ralph Bancroft

As 1984 starts there is still no sign of Acorn's promised second processors for the BBC micro. Unless, that is, you happen to be in India.

The Queen has made a special gift to the Indian government of six Econet systems. Intended for use in universities and other institutions, the systems have been treated as a showcase for Acorn's products and included with the BBC micros was a number of specially assembled 6502 second processors.

An Acorn spokesman confirmed the second processors were included in the package, and said the company is still not in a position to

say when the processors will be generally available in the UK.

'All the production plans have been finalised including the detailed designs,' he said. 'However, the company has yet to announce which company will be doing the assembly of the products.'

One major hurdle to be overcome is the building up of an adequate supply of chips. 'These days you have to place your orders six months ahead,' he said. Several UK micro makers are facing the same difficulty.

Since this is the time for New Year's resolutions, how about it Acorn?



BACK-PACKING — Time was you could cop for a handful of games and put them all in the pockets of your mac. These days, a trip to your local software dealer involves a rucksack and two carrier bags. Where will it all end? Soon you'll have to go accompanied by a porter. Cassette packaging, as you can see, is something of a boom industry, an unexpected spin-off from the growth and profit made over the last few months in software production. Based on the tried-and-true American ideal of bigger is better, publishers are now literally trying to edge each other off the shelves. Presumably this expansion will bring more work to flagging Britain as other associated trades are roped in to help supply the voracious demands of promotion.

TI: prospects improve for '84

By Sandra Grandison

The new year could bring glad tidings for beleaguered TI 99/4A users after the shock late last year of their supplier's withdrawal from the home computer business.

At the moment Texas Instruments is in the throes of deciding whether it will hand over its property rights to let other companies in the UK continue production of hardware and software for the 99/4A — and eventually come out with a new generation of machines.

Clive Scally of the TI-994A UK user group said: 'Since TI has stated

it's no longer going to produce home computers and software, user groups have put a lot of pressure on the company, so perhaps something will come out of it.

'To my knowledge, users in the US can buy third party add-ons and software from companies, but this facility is not available here. Hopefully, by January TI will have made a decision as to whether it shall let it happen in the UK.'

'With regards to servicing machines, TI says that it will continue to support its range of home micros indefinitely,' Mr Scally said.

Fair play rules...

By Geof Wheelwright

Add-ons were the big movers at the Your Computer Christmas Fair — with keyboards, light pens, light rifles and joysticks heading the list.

The most popular items at the show were probably 'real' keyboards for the Sinclair Spectrum and ZX81. DK'tronics was doing a roaring trade selling its full-travel Spectrum keyboard — a popular number, with paste-on labels for the keys and a £46.25 price-tag.

Even cheaper — and looking somewhat sturdier — was Ricoll Electronics' metal-encased keyboard for the Spectrum. At £37.95, the keyboard includes an all-metal box (not something you'd want to drop on your toe) and a 'proper' full-length space bar. By Friday afternoon — the second day of the four-day show — Ricoll had sold all its keyboards and had to start ordering more. It hopes to have more keyboards in stock by early January, and it anticipates a £5 price-increase combined with a step-up in production to ease the shortage.

Light pens were also shifting well, with new releases for the Spectrum, Vic-20 and BBC micros. They were so popular, in fact, that one manufacturer didn't want to give any details on his light pen for fear more people would order them than he could supply.

The light-pen manufacturers that did want to talk about their wares had a good deal to offer. Add-on Electronics has a light-pen that will work with the Spectrum, BBC, Oric, Dragon and Commodore's 64 and Vic-20 machines.

Stack Computer Services offers its light-pen for the Atari range of micros and Commodore machines as well as the BBC micro. But Stack's best-seller at the show was the light-rifle. For £29.95, it will work with the Commodore machines and Sinclair's Spectrum.

The light rifle connects to the computers by a 12-foot cable and



three arcade-style games to use the gun are included with the price. Stack is also encouraging software houses to write programs that will offer the option of using the gun. So far titles include Rats and Cats, Escape from Alcatraz, Big Game Safari and Crow Shoot.

The recent appearance of Sinclair's cartridge software and joystick Interface 1 for the Spectrum seemed to cause prices of joystick interfaces from other manufacturers to plummet. Kempston's interface, for example, sold for £14.99, and was on special for £9.95 for the duration of the show.

A 'new' old peripheral also found its way to the show. The Mattel Aquarius data recorder and thermal printer were finding their way on to other machines under the brand-name of Manta. The 40-column thermal printer runs at 80 cps and will print upper and lower case letters as well as graphics.

Selling for £99, the printer can be used with the Oric, Spectrum, Dragon, Aquarius and BBC micros.

The data recorder can be used with the same set of machines and sells for £30. Add-on Electronics, which is selling the equipment, is also offering free software with both the printer and data recorder: worth £30 with the recorder and £99 with the printer.

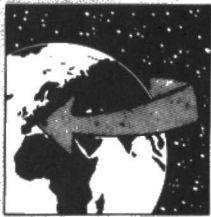
Disk drives and software were also on special offer, with a number of drives under £250. Among the more attractive deals was Opus Supplies' £180 disk drive for the BBC. The 5¼in single-sided 40-track drives have a formatted single density capacity of 200K and a double-density formatted capacity of 400K.

The company's dual drives were also relatively cheap — at £380 for the single-box dual disk drive unit. Software prices were also down, with old Atari, Vic-20 and Apple games finding their way to the bargain barrel.

Third party 3K and 8K memory expansion cartridges for the Vic-20 also joined the bargain bin, at £5 and £10 respectively.



VIEW FROM JAPAN



Shake-down in the Tokyo corral

By Serge Powell

What's the opposite of a shake-out?

Whatever it is, there seems to be a minor one happening here at the moment. Perhaps it's a shake-in; in part it must have something to do with MSX Basic, but it also bears out the old adage that the personal computer business is still full of opportunity for any company or person with an idea. The idea can be new or good, but the best ones are both.

I must admit that I was sceptical when the press hand-out crossed my desk, especially when I came to the line 'A bold step . . . to establish a solid base in the personal computer market based on extensive expertise in consumer audio and video products' — this at a time when some companies with extensive expertise in the PC market are having a hard time making a go of it.

The first reaction is to sit back and sigh: 'Ah yes, another Japanese manufacturer entering the fray.' But this one could have more to recommend it than most. Perhaps JVC is on to a good thing. Learning from its gross marketing mistake when it sponsored the inept England touring team to Australia last year, it has stuck to what it's good at.

The product hinges on a little unit called a Superimposing Adaptor that connects to a not particularly spectacular computer — 16K or 32K of RAM, 32K of ROM, 32 by 24 display, 256 by 192 graphics, 16 colours, and MSX Basic-compatible.

With JVC's well established name for video cassette recorders and VHD laser disks it isn't so much a question of the company entering the personal computer market as adding a natural extension to its existing product line.

Consider, for example, the use a Japanese family might make of the new device (I forgot to mention that for now, the product is destined only for the domestic market so those on holiday abroad will have to wait a while). After video-recording the family's antics on their portable VCR with scenic highlights in the background, Poppa and Momma Tanaka and all the little Tanakas hurry home, connect the family computer to the video system, and lo and behold, they start superimposing titles and integrating graphics with their video tapes just like the professionals.

The possibilities opened up by interfacing with a video disk are even more intriguing when you take account of the vast amount of visual information a laser disk can store; and the direct access capabilities of the laser playback system coupled with the programming possibilities of the ROM packs that slot into the JVC computer; not to mention that the Superimposing Adaptor can be coupled to joysticks.

Imagine caves, adventures, maps and monsters and armies of galaxies all in immediate prospect.

There will be more — you'll be able not only to read about them on screen but see them as (at the very least) still pictures, and possibly motion pictures that will change perspective dramatically as you interact with the game.

On the serious side, the potential for educational programmers is even more impressive, especially in technical fields, all of which helps to answer the never ending question of what the future might possibly be holding in store for chip-heads.

But it still leaves me wondering what the opposite of a shake-out might be.

While the western world worries about a chip shortage Japan is going through a less serious dearth; this is led not by the computer makers but by audio, VCR and television manufacturers. VCR equipment in particular is seen — as far as sales are concerned — as a heavy drain, but JVC won't be cutting its own supply lines just yet.

Oddly enough the demand for VCRs is linked by some industry observers to the Olympic Games next year. If it persists, you probably won't be seeing the Superimposing Adaptor overseas for several months, but Japanese visitors to the Games face an unprecedented possibility; filming everything on their video cameras, they can return home and alter things with the micro so that Japanese competitors win everything.

Soft change

Look out this year for a new direction in micro software. It isn't quite games, and it isn't purely educational — recreational software is on the way.

This is the prediction of Clive Digby-Jones, head of Websters Software, the company that supplies major chains such as Boots, Tesco and Ketts. 'Games are important because kids learn to use the computer through them, and there are probably valid educational reasons why we should encourage this,' he said. 'But software suppliers have got to move beyond games.'

Mr Digby-Jones referred to a computer competition in the area around Websters' former Godalming offices; it was won by a 65-year-old, and 70 per cent of the entries came from women. The image of the alien-zapping juniors obviously needs to be updated, but gardening programs and chest freezer stock control aren't the answer.

Websters' background is in books, and Mr Digby-Jones sees the software industry developing along parallel lines — especially

where books and programs are packaged together.

As a distributor, taking programs from software houses and presenting them to retailers, Websters is in a good position to direct trends through its buying power — this starts from purely commercial reasons but should ultimately benefit the user. 'We look for slots in the market: we try to identify early on where there is no software and we will talk to software producers about possible ventures they could join in to fill the gaps,' he said. Some early products of this type of co-operation could be software for the disabled and for children in care.

The benefit isn't confined to the range of software available — a distributor the size of Websters helps to increase the stability of the software supplier, and Mr Digby-Jones pointed out: 'We haven't yet had a case where we've had to take out a product because the supplier is no longer in the market.' By placing its orders with software houses four or eight weeks in advance it also promotes stability, which is good news for software buyers.

Matchmaker takes on an Octopus

Loxton Computers has launched a system to give more power to the estate agent's arm — or in this case, eight arms. Its Matchmaker package is built around the LSI Octopus.

Matchmaker is designed to automate one of an estate agent's most common jobs, matching clients' requirements with the properties on its books. It also takes on the task of arranging and addressing property details. Hardware and software

together cost £5,000.

The system comes with a keyboard overlay giving such commands as Property Enquiry, Client Enquiry and others to make it easy to use.

The software design process was helped by a Tunbridge Wells estate agent, and Loxton's marketing manager Chris Roffey said that nobody would need a computer science degree to use the system.

The basic Octopus has a 400K floppy and a 5Mb hard disk that can be expanded to 40Mb. Up to 16 terminals can be supported. If you already own an Octopus, the software alone will cost £1,150.

Loxton is on 0634 243000.

Sunny outlook for Osborne UK

Things are looking up for Osborne users as further developments in the States mean that the UK outfit will be marketing and distributing products, while the manufacturing side will be handled by an independent company.

This move strengthens Osborne UK's commitment to produce machines under the company's banner and support its users in this country despite its troubled past.

As part of its relaunch campaign in the new year, the company intends to sell the Osborne 1 with its free bundle of software for under £1,000. In addition users will be

able to upgrade their Osborne 1s and Executives with an 800K floppy disk drive, and if you're in for mass storage, a 10Mb hard disk version for the Executive will also be available. And the long awaited PC compatible Executive which will run IBM PC's software is still on the cards.

Any Osborne user who joins the British Osborne Owners' Group (BOOG) can take advantage of a ten per cent discount on products. The group also offers the possibility of influencing the manufacturer.

Contact Bruce Durie on 0494 445145 for further information.

Elstree hunts ProCalc bugs

By Ralph Bancroft

No sooner has Elstree Computer Centre produced a spreadsheet program for the Newbrain than it runs into complaints from users.

The program, ProCalc, costs around £40 and aims to provide the usual spreadsheet facilities for the recently rescued micro. However, a number of problems with the package have appeared that may limit its usefulness.

The first concerns the maximum size of spreadsheet the program can handle. The manual says up to 10 pages of 30 columns and 250 rows can be used, depending on the memory available. Unfortunately it gives no indication to the user of how to calculate in advance the

maximum for an application.

As a result the program crashes without warning when the memory required exceeds what is available.

Alan Fish, Elstree's software manager admitted that this could make life difficult for users. 'It sometimes happens that you do not know a fault exists until a program goes out to users. In this case it is clearly important for us to write a check routine into the program and to warn users that they are running out of memory and giving them options on what they want to do next,' he said.

Another apparent problem is that the program crashes if a calculation uses for input the results of a previous calculation.

£22.90 for an item that had been advertised the previous day at £19.95. On querying the price he was told that £22.90 was right, take it or leave it. 'I took it because I did not want to disappoint my son,' he told PCN.

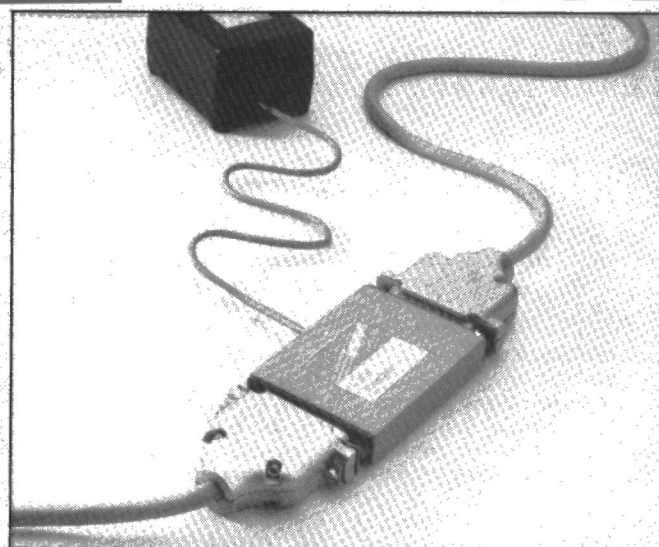
We contacted Sonic Foto and Micro Centre, the shop concerned, and it immediately admitted that Dr Gribben had mistakenly been overcharged. A spokesman said that he would contact Dr Gribben to arrange a refund. But he did point out that prices do occasionally change after they have been advertised, and that this possibility is mentioned in the advertisement.



Keep your eye on the price

Are the prices published in advertisements sacred?

The question arose when Dr John Gribben of Lewes was charged



PERIPHERAL VISION — Who knows, there may be circumstances under which you'd want to have your peripherals more than 30 metres from your micro. If you do, be warned that the signal at these distances becomes

weak and less reliable. Inmac has produced a £103 booster to overcome the problem for any RS232-compatible peripheral, and all you need to install it is a screwdriver. Inmac is on 04427 74296.

Basic truths

Happy Birthday Basic! Coinciding with the 20th anniversary of the birth of their now widely-used language, Professors Kemeny and Kurtz of Dartmouth College plan to rewrite the enfant terrible.

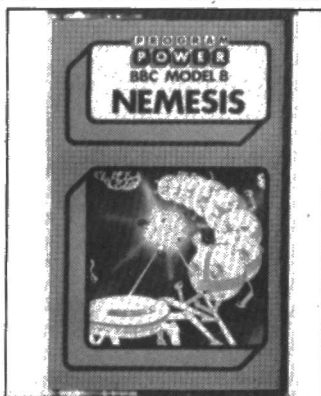
True Basic Inc. with financing from ex-Dartmouth students and three professional programmers, has been founded to perfect the language. The new version, which promises portability and greater structure, should be available by autumn 1984.

True Basic hopes that the revised version will be adopted as the new standard by personal micro manufacturers. It also hopes prices will be kept low to encourage its use in education — the original intention for Basic.

Basic, as implemented on most micros, leaves a lot to be desired. True Basic may provide some extensions and improvements, but it's doubtful that it will provide a challenge to Microsoft's well-established version.

SOFTWARE

PCN rounds up the software releases.



Games

Spectrum: Sinclair has brought out a new tranche of ROM cartridges for the Interface 2. At the reduced price of £9.95 are Psst, Cookie, Hungry Horace and Horace and the Spiders. At the higher price of £14.95 are top sellers Jetpac and Tranz-am. Meanwhile on the cassette front Imagine has brought out a war strategy game called Stonkers. Written by the author of Molar Maul and Zzoom, the game features elements of arcade

action to present a mythical conflict somewhere in Northern Europe. Also from Imagine is Alchemist, a real time graphics adventure that has the hero with the power to turn himself into an eagle flying over the obstructions in the way of his quest to slay the dreaded worlock. Both games are priced at £5.50.

BBC: Papillon Software (01-518 1414) has secured the distribution rights to the highly rated shoot 'em up game Zalaga. Selling at £6.90, it is reckoned to be good enough to outsell Arcadians. Micro Power is keeping up its recent flood of software with five new arcade action games: Nemesis (£7.95), Bumble Bee (£7.95), Cosmic Combat (£6.95), Space Jailer (£6.95) and Positron (£6.95). Other new additions to its catalogue are Intergalactic Trader, a role playing game at £8.95, Draughts (six levels of play for £6.95), and Wizards Challenge, an adventure at £7.95.

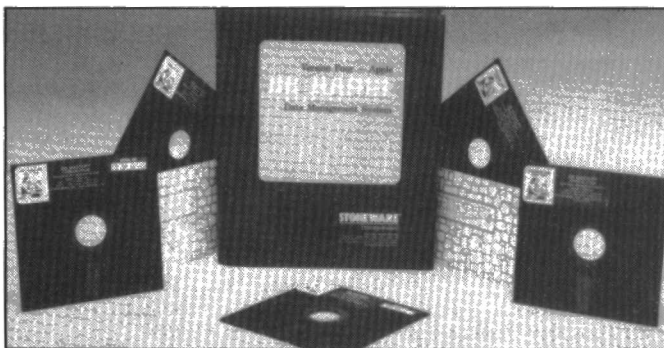
Apple: Pete & Pam (0706 212321) is now able to offer Infocom's

most recent adventure classic, Suspended. Available on disk for £33.95, the game casts you in the role of the controller of a network of computers and six robots with which you have to maintain the planets' equilibrium. You are awoken from your cryogenic sleep and the nightmare begins... Also from Pete & Pam is Quizagon, a game for which you will require a combination of strategy and luck if you are to answer the 6,000 questions correctly. It can handle several players at once and costs £26.95.

Business

Apple: Booksellers can get a custom designed package called Book Order Register and Inventory System from Applitek, (01-995 5446).

BBC: Gemini (0395 265165) has combined some of the more useful business software programs to form five combination packs, each containing a selection of programs and manuals. A BBC user can obtain two of these packs for under £240 containing such programs as payroll and word processing.



Ringling changes in micro sales

If you wake up one morning to find a freezing cold salesman flogging micros on your doorstep, don't be surprised.

Distribution of computer-related products is in trouble and new methods must be found, according to a report out from market research company Strategic Incorporated.

'Microcomputer Distribution — the Key Issues' looks at the changes in distribution that must come about due to the computer market's expected growth. This will mean even more (and perhaps better) ways of selling you a micro.

Strategic expects the number of personal computers shipped throughout the world in 1982 to double to 4.5 million in 1985, and distribution channels must be found to deal with this.

One expected method is the door-to-door approach with salesmen selling micros as they do with double glazing or encyclopaedias, while another channel likely to

emerge is the PC supermarket selling a range of micros and related equipment under one roof from various manufacturers, rather like a computer fair.

A more obvious method and already a growing phenomenon is teleshopping, ie ordering products via the communications media from a giant central shopping and distribution mechanism.

Among more conventional methods is the possibility of regional or national broker sales forces, calling on individual users with complementary lines from different manufacturers.

System houses and retailers alike will expand sales forces into horizontal and vertical markets, eg, educational, medical, banking. These areas would demand customised software with sales and support staff familiar with specific markets.

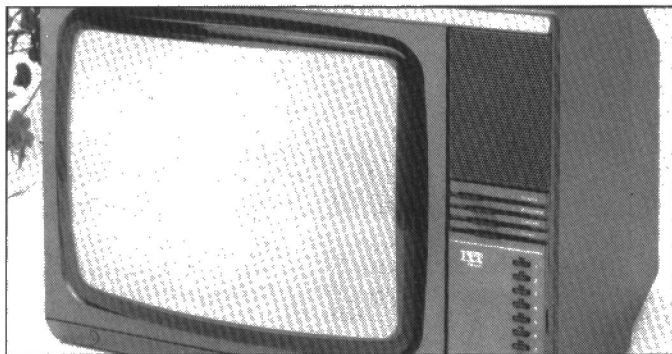
Distribution of low cost home computers is expected to spread to jewellery shops, supermarkets and chemists.



CASH MEMORY — Proving that cash registers with metal casings, cheery bells, and price tickets that pop up in a window belong to the age of white fivers, P&M Data Services (0895 52131) has designed a till with a built-in Epson HX-20. As well as the normal processing of the Epson, P&M's unit lets you adjust stock lists at the point of sale with room for 1,800 items. It calls the system the ED-20, and claims that a shopkeeper can use an unlimited number in a cluster. The one-off price is £950.

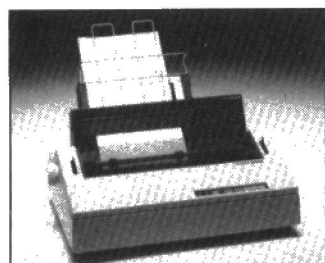
PERIPHERALS

PCN rounds up the latest add-ons.



ITT's RL2301 — choice of RGBS or PAL.

Printers: The birth is announced of an addition to the Brother range — if it grows much further they'll have to find seven brides for them. The new model is the HR25 daisywheel printer, which operates at about 23 cps and has such features as text-reprint, a 3K buffer and data transfer up to 9600 baud. It costs £795, with a Centronics or a serial interface. The sheet

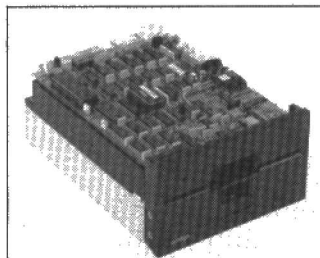


Qume's Letterpro 20 daisywheel.

feeder is an extra £220 and tractor feed is £85. The distributor is Thame Systems (084421 5471).

Euroelectronics' (0242 582009) ZX Lprint Centronics interface for the Spectrum is now available in a version that will run with Interface 1 and Micro-drives. If you already have ZX Lprint I or II a conversion can be carried out for £3.25.

IBM users interested in a spot of plotting can now use the Printronix MVP printer/plotter — Universal Microperipherals (01-683 0060) has inserted a modified PROM to make the unit PC-compatible. Its plotting rates are 8, 16 and 27in per minute at a maximum density of 100×100 dots per square inch. As a printer its highest speed is 600 cps. The base price is £2,960.



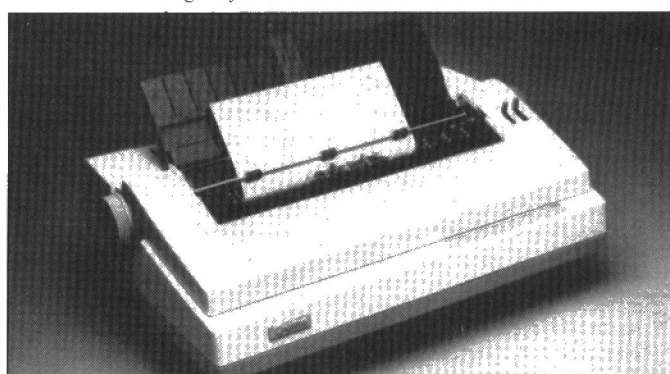
3.2Mb on a 5¼in floppy from Amlyn.

Qume, the originator of the daisywheel, has moved into the personal computer world with its Letterpro 20, a 20 cps daisywheel. Qume will supply the printer with Centronics, serial and Qume parallel. The unit costs £747.

Disk Storage: HAL Computers (0252 517175) is distributing high density Amlyn floppy disk drives that will give you 3.2Mb

unformatted. The price to dealers is £342 per unit, which sounds as though the cost per Mb to you will be not far off £125. The drive has its own Intel 8051 processor to handle real-time control functions. Referred to as the 1860, it measures 3.25in by 5.75in by 8in — the floppies themselves are 5.25in disks and the interface is Shugart-compatible. Average access time is 88 milliseconds.

Monitors: ITT Television and Video's contribution to a colourful new year is a pair of 14in monitors. The RL2301/1 takes RGBS input and costs £280; the RL2310/M is for micros that only give PAL signals and it costs £310. For more information contact 01-930 6711.



The HR25, latest addition to the Brother family of printers.

PCWcharts

Hardware Top Twenty up to £1,000

TW	LW	MANUFACTURER	PRICE	DISTRIBUTOR
1	(1)	Spectrum	£99	(SI)
2	(2)	CBM 64	£220	(CO)
3	(3)	BBC B	£399	(AC)
4	(6)	Sinclair ZX/81	£45	(SI)
5	(4)	Vic 20	£140	(CO)
6	(5)	Oric 1	£99	(OR)
7	(7)	Dragon 32	£170	(DD)
8	(16)	Atari 600XL	£160	(AT)
9	(11)	Lynx 48/96	£225	(CA)
10	(10)	Sharp MZ700	£240	(SH)
11	(12)	Apple IIe	£750	(AP)
12	(9)	TI/994a	£90	(TI)
13	(8)	Atari 800	£300	(AT)
14	(13)	Colour Genie	£168	(LO)
15	(15)	Sharp MZ80A	£349	(SH)
16	(18)	Aquarius	£70	(MA)
17	(14)	Tandy Colour	£180	(TA)
18	(17)	Epson HX20	£472	(EP)
19	(-)	CGLM5	£150	(SO)
20	(19)	Newbrain A	£269	(GR)

These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets in the two weeks up to December 20.

Neither mail order nor deposit-only orders are included in these listings. The prices quoted in the hardware charts are for the no-frills models and include VAT. Information for the stop-selling micros is culled from retailers and dealers throughout the country and like the games, is updated every alternate week.

PCN Charts are compiled exclusively for us by MRIB (Computers), London (01) 408 0250.

Top Ten over £1,000

TW	LW	MANUFACTURER	PRICE	DISTRIBUTOR
1	(2)	IBM PC	£2,390	(IBM)
2	(1)	ACT Sirius	£2,525	(ACT)
3	(6)	Apricot	£1,719	(ACT)
4	(4)	Commodore 8000 series	£1,200	(CBM)
5	(4)	Apple III	£2,780	(AP)
6	(7)	Kaypro	£1,949	(CKC)
7	(10)	Televideo TS-800 series	£1,495	(MD)
8	(5)	HP86A	£1,570	(HP)
9	(9)	DEC Rainbow	£2,714	(DEC)
10	(8)	Epson QX10	£1,995	(EP)

Games Top Thirty

	GAME TITLE	PUBLISHER	MACHINE COMPATIBLE										PRICE
			SP	AC	64	V20	81	DR	OR	AT	OTHERS		
► 1 (1)	Atic Atac	Ultimate	★									£5.50	
▲ 2 (3)	Lunar Jet Man	Ultimate	★									£5.50	
▼ 3 (2)	Valhalla	Legend	★									£14.95	
▲ 4 (7)	Chequered Flag	Psion	★									£6.95	
▲ 5 (10)	Pyramid	Fantasy	★									£5.50	
▼ 6 (4)	Ant Attack	Quicksilva	★									£6.95	
▼ 7 (5)	Splat!	Incentive	★									£5.50	
► 8 (8)	Flight	Psion	★				★					£6.95	
▼ 9 (6)	Metagalactic Llamas	Llamasoft				★						£6.00	
▼ 10 (9)	Hobbit	Melbourne	★	★	★				★			£14.95	
▲ 11 (15)	Hunter Killer	Protek	★									£7.05	
▲ 12 (14)	Kong	Ocean	★									£5.90	
▲ 13 (17)	Arcadia	Imagine	★		★	★						£5.50	
▲ 14 (–)	Mr Wimpey	Ocean	★									£6.90	
▲ 15 (23)	Falcon Patrol	Virgin			★							£7.00	
▼ 16 (11)	Horace and the Spiders	Psion/Melbourne	★									£6.95	
▲ 17 (–)	Snooker	Visions	★									£8.95	
▲ 18 (–)	Moonbuggy	Anirog			★							£7.00	
► 19 (19)	Hovver Bovver	Llamasoft			★							£7.50	
▲ 20 (–)	Dimension Destructors	Artic	★									£5.95	
▼ 21 (13)	Manic Miner	Bugbyte	★									£5.95	
▼ 22 (20)	Mad Martha II	Mikrogen	★									£6.95	
▲ 23 (–)	Cuddly Cuthbert	Interceptor			★	★						£8.00	
▲ 24 (–)	Penetrator	Melbourne	★									£6.95	
► 25 (25)	Zzoom	Imagine	★			★						£5.50	
▲ 26 (–)	Rommel's Revenge	Crystal	★									£5.50	
▲ 27 (–)	Siren City	Interceptor			★	★						£8.00	
▼ 28 (22)	Gridrunner	Llamasoft	★		★	★		★		★		£5.00	
▲ 29 (–)	Twin Kingdom Valley	Bugbyte	★									£5.95	
▲ 30 (–)	Death Chase	Micromega	★									£6.95	

Manic Miner's marathon

Regarding the letter in Issue 39 on unlimited lives for the Spectrum game Manic Miner, I can confirm that when more than 32 lives have been reached, screen **distortion** does happen, increasing with each extra life received.

I have not used the POKE for unlimited lives, but have played through the stages in a proper game. My score stands at 1,033,993 and I have 33 miners.

I have been taking photographs at various stages which I hope will prove my score.

A Sweeting,
Humbleton,
Hull.

Can someone defend software copyright?

William Dickinson's letter (Issue 20) has raised my ire. Now what's all this about 'software theft'? Has someone pinched someone's software which was meant for a special purpose?

Apparently not. No, it's this old bogie about paying over and over again for another person's work — something I have never quite understood because I, like so many others, perhaps the majority, only get paid once for what I do. Furthermore, I have no control over what the person who pays me does with the product. Not can I relate what proportion of his profit I get, however it might affect me.

So, what price this so-called copyright? It's an artificial barrier to enable some lucky people to go on, perhaps to infinity, reaping rewards for a job that, let's face it, can only be done once. Sorry, but I consider that dishonest.

Another interesting point is that very often your worth as a producer of original material is enhanced by these copiers. After all, to a large extent you're getting free publicity if you play your cards right. So, you have to work to reap the benefits of that publicity. OK, so do the copiers; but it's a lot harder for them because they don't know the product as well as the author does.

A last word on the subject. I think that, despite dire warnings, people will go on copying software, books, music etc. It costs someone money every time a case is brought concerning copyright. I doubt if there is



Don't carry a LOAD on your shoulders,
unburden yourself on PCN's letters page.

any organisation which could afford to prosecute in all cases, and in any case who is to say what the limits are.

Consider for example that despite local bye-laws, statute law and others, including law on copyright, people still play radios in public places without licence. As long as radios are made with this capability, this will continue, law or no law. You try to eradicate it . . .

L Hipkin,
Stevenage,
Herts.

Problem is, while it may be impossible to eradicate, software piracy is a contributor to the cost of packages. So the consumer pays anyway. —Ed.

Final point for micro purchasing parents

I am studying O-level computer studies at school, and I have another viewpoint on computer studies in school to add to those already offered in Random Access.

I was annoyed at the editor's reply to Mr D Wright (Issue 41) on choosing a micro for children at school. Different manufacturers tend to produce very different versions of the programming language, Basic, making it inadvisable for parents to buy micros that are incompatible with their children's computers.

My fellow pupils rush out to buy Spectrums, Dragons and Vic-20s, learn their respective Basics thoroughly, and write excellent programs. But on discovering that they will soon need to submit a completed computer program to contri-

bute to their final exam result, they venture into the computer room and head towards the BBCs (all computer programs for exams must be written on the school computers, in our case the BBC.)

They then attempt to program this computer, of which they have very little knowledge, unsuccessfully. Their minds are filled with Sinclair Basic, and they find this unfamiliar programming language difficult.

I think parents should consider this before purchasing a micro for their children. eg if the school uses BBCs then the parents could consider purchasing an Electron if the BBC itself is beyond their budget.

Or would it be better to wait until a child has finished its computer education before purchasing a micro?

R Pierrepont,
Horsley,
Derbyshire.

You make a good point but surely most people would agree that any computer is better than no computer at all. Also, generally speaking, young people learn computer skills quicker than the oldies, so waiting could be counter-productive. —Ed.

Another editorial policy required

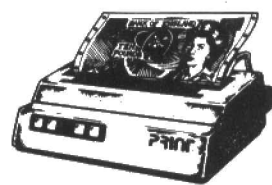
Here is a poem written as a response to the 'Editor' type letters:

I'm talking editors again,
Some people really are insane,
To think that those whose fingers fly,
Across the keys don't curse and cry.

Their programs hold mistakes so grand,
Would take years to re-type by hand.

An editor would save the day,
But theirs does not have easy ways,
Complex commands like Is and Ds,
Useless ones like X and Es
They press RETURN and ENTER too,
Oh, and X is fine I'm told by you.

PCN £10 Star Letter



What I would like and hope to see,

A better editor that seems friendly,
A full screen one so you don't sob,
With cursor keys that do their job,
A standard one that would be fair,
Used by Acorn and Sinclair,
And TIs, ORICs, Apples too,
That is to name just but a few.

Microsoft you are in disgrace,
From four keys you use just backspace,

If it's good like you make it seem,
Then why do some prefer full screen?

Those that try both systems out,
Won't even have the smallest doubt,

About which is best they'll all agree,
That full screen is, believe you me.

So come along, we have to change,
Before the chance is out of range.

Julian Skidmore,
Trowell,
Nottinghamshire.

Share your thoughts in the UK's liveliest micro weekly letters columns. Funny, feisty or fanciful, your letter could win you £10 if it's of star status.

WRITE TO: Random Access,
Personal Computer News,
VNU, Evelyn House, 62
Oxford Street, London W1A 2HG.

Lost in a maze of bits and bytes, trapped in a forest of errors, bugged by Basic? Whatever the problem, CALL on us. Our panel of experts is at your command.

Write to: Routine Inquiries,
Personal Computer News,
VNU, Evelyn House, 62
Oxford Street, London W1A
2HG.

A printer for the Electron?

Q I would like to connect my Electron to a Texas Instruments Omni 800, 810 RD Terminal Printer. The users manual that came with the micro does not say anything about connecting the micro to anything but a tape recorder. Also, what stops BBC B programs from running on the Electron?

Allan Hardy,
Slough, Berks.

A Connecting a TI thermal printer – or any other printer – to your new Electron is theoretically impossible as the machine has no printer interface and Acorn doesn't have plans for bringing one out until at least the spring.

However, there are ways of getting round this problem. A Welsh company – Sir Computers, based in Cardiff – should have a printer interface for the Electron available by now selling for about £45. The interface lets you run a parallel printer and joysticks from the Electron.

However, this doesn't help you much with your TI printer as it uses an RS-232C serial interface rather than a standard Centronics parallel to get information from the computer. There are currently no plans (at least none that we've heard of) to produce an RS232C interface for the Electron in the near future, although Acorn has said in the past that they will eventually offer all the components you need to turn the Electron into a BBC Micro – and that should include an RS232C interface.

In short, unless you are an electronics expert and willing to figure out how to solder some sort of home-built RS232 onto your machine (which is a dodgy proposition anyway), the best you can do is sell your printer and invest in a parallel interface and any one of a number of cheap thermal or dot-matrix printers on the market.

The answer to your second query is perhaps a little more

cheery. Although programs will not necessarily run the same way on the Electron as the Beeb.

The major differences are in the SOUND and ENVELOPE commands, and in the lack of a Teletext screen Mode 7 on the Electron. This means that any programs that start in Mode 7 will come out scrambled on the Electron. The differences in the SOUND and ENVELOPE commands mean that the Electron can only play one musical note at a time (so any BBC program that involves playing musical chords won't work properly on the Electron); also, the Electron has no volume control.

But, if your BBC programs don't use Mode 7, rely on volume control or chords in the music or sound effects, they should run on the Electron without any modifications. For more details on this and other Electron questions look in the PCN Electron Micropaedia starting this issue.

Buying a faulty micro from a shop

Q About 6 months ago I bought a Spectrum. After a week it started to overheat and some of the keys wouldn't generate correct characters. My father took it back to the shop but couldn't get a replacement as they'd sold out. This carried on for three weeks, so he asked for his money back. Because the shop would only give a cheque refund, not cash, he took an Oric as a replacement. Now the Oric has broken. We took it back to the shop and it has been sent away to be fixed. I'm really cheesed off with the whole business and want to know if there's any chance of getting my money back from the shop.

Nicky Morris,
Dunstable.

A You seem to have had a run of bad luck. We don't understand why, if the shop has sent off your Oric for repairs, it didn't do the same in the first instance with your Spectrum. But, it would have been prudent to have taken the cheque offered: we don't think the shop has any obligation to refund cash. The faults in the machines are not entirely the shop's responsibility, and the management would appear to be acting in good faith so you'll just have

to be patient waiting for the return of your Oric.

Atari vs BBC – an old chestnut

Q Considering all aspects of computers – graphics, colour, sound, memory etc – could you tell me which is the best computer out of the BBC Model B and the Atari 800?

Also, is there a modem built for the Atari, and if so how much is it?

Paul Edwards,
Camberwell, London SE5.

A If we were playing cricket rather than talking about micros this would be a full toss. Not because it's easy to answer – 'which is the best?' questions never are – but because much of the answer has already been written in PCN.

Instead of referring you to the back issues department to have a look at Issue 16, where Andrew Tollyfield compared the BBC with the Atari 800, let's see what he had to say.

Unfortunately you don't say what your main use of the micro will be. Considering all aspects, a Cray 1 might be a better computer than a Beeb or an Atari.

The Atari, according to Andrew's review, has the edge in graphics, sound and colour. The BBC, he says, has a superior Basic and is also faster. In theory it has the greater potential for expansion. The Atari 800, with 48K RAM, has more memory for you to use.

More to the point, perhaps, the Atari 800 is now considerably cheaper than the BBC but there are reasons for this that might be relevant to your choice. Atari is concentrating more now on the recent XL systems; nobody would suggest that the 800 is going to be left high and dry but your prospects of continued software, in terms of quantity and diversity, look better with a BBC.

On the subject of modems, the answer is unequivocally yes. You can get an expansion interface with an RS232 port through which you can attach a modem – the cheapest would probably be the Prism 1000, at £69.95. If you are particularly interested in modems keep an eye open for Issue 46 with a PCN Micropaedia devoted to them.

Oric objects to colour collision

Q I have an Oric and am puzzled by two aspects. Firstly, what is the ESC key for? It doesn't stop a program and I can't seem to use it to send escape sequences to change colours etc.

Secondly, as far as I can work out, using serial attributes for the colours means that you can't have a character move too close to a wall if the colours of the character and the wall are different colours.

MJ Bryant, Knutsford,
Cheshire.

A The ESC key on the Oric is mostly for show. If you collect it in KEYS, then take its ASCII code, you'll find it has the value 27. You could use this in a program to provide a user with a means of 'escaping' to a previous menu, eg.

```
1000 A$=KEYS: IF A$=""
      THEN 1000
1010 IF A$=CHR$(27) THEN
      POP:RETURN
```

This assumes that you're in a subroutine called from within a previous subroutine and POP will RETURN control to the level of GOSUBs above the calling routine. This looks something like this:

```
MAIN MENU
(GOSUB)
SECOND MENU
(GOSUB)
THIRD MENU
(POP:RETURN)
```

This takes you back to the end of the main menu, rather than to the end of the second menu, which is where RETURN alone would lead.

As for your second query, you're quite right. To set the colour for a character locally you have to place an attribute to its left. This means that a character cannot get nearer than 1 byte to left and right walls of a different colour.

For the right-hand side it would overwrite the attribute of the wall, setting the wall colour to the same colour as the character.

If it were next to the left-hand wall it would overwrite the pattern of the wall itself with its own colour attribute, making a hole in the wall.



MICROWAVES

Scaled a new PEEK in microcomputing? If printed your tip will earn you a fiver.

If you've got something to crow about... a bit of magic that'll make the world a better place for micro users, then send it to **PCN Microwaves**—our regular readers' hints and tips page. We'll pay you £5 if we print it. We'll pay you even more if your little gem gets our vote as microwave of the month. Think on... and write to **Microwaves, PCN, 62 Oxford Street, London W1A 2HG.**

Make your micro go Beep beep

When the following program is run, it will enable the BBC to respond to a key being pressed, with a beep.

```
10 CODE%=&70
20 P% = CODE%
30 ?&220 = CODE% MOD 256
40 ?&221 = CODE% DIV 256
50 [
60 LDA #7
70 JSR &FFEE
80 RTS
90 ]
```

To switch the beep on use *FX 14,2 and switch off with *FX 13,2

If you have a more recent operating system than OS 1.2 then you will be able to vary the type of beep you get using the following FX calls:

*FX 211,X Where X is the channel number
 *FX 212,X Where X is an envelope number (0 to 127 in step so of four)
 *FX 213,X Where X is the pitch (0-255)
 *FX 214,X Where X is the duration (0-255)

Anwar Ali and
 Gary Woolridge,
 Handsworth,
 Birmingham.

Basically breaking in a Lynx

With modification, D P Akerman's hint (*Issue 38*) on determining whether the break key has been pressed, can be used to stop a Basic program while it is executing. The following four lines of Basic, when inserted at the top of your program, will allow you to do this. On

executing your program once, lines 2 to 4 can be deleted (but not line 1).

```
1 CODE 0B ED 56 FB 76 AF ED 4F
  FB 76 ED 5F FE 08 20 03 C3 42 1E
  08 C9
2 DPOKE &6297,&4DED
3 DPOKE &622B,&6954
4 POKE &622A,&C3
  Clive Newton,
  Cwmbran,
  Gwent.
```

Setting your Spectrum FREE

As the Spectrum does not have a FREE command as other micros do, here is a short program to overcome it.

It gives the amount of spare memory in bytes available for your Basic program.

```
9999 LETS=(PEEK23730+(256*
  PEEK23731))-(PEEK23653+(2
  56*PEEK23654)):
PRINT "SPARE" MEMORY =
  "S;" BYTES"
  Mr M Groll,
  Rugeley, Staffs.
```

Is this how to get a tip in Microwaves?

The following routine, used on the Spectrum (16/48K) is a neat little trick to print out text on the screen. It does not use the print statement to its usual effect.

```
10 BORDER 0: PAPER 0: INK 0:
  CLS
20 PRINT "This is a routine
  written to flatter Personal
  Computer News so that my
  program gets printed in Micro-
  waves"
```

Keeping fine time

Most Commodore 64 users will be well aware of the TI\$ function which allows access to the inbuilt clock for use in programs. However you are limited to hours, minutes and seconds. It is often the case that a timing system is required that will operate in tenths of a second. Well, it is possible to go one better than that and program in 100ths of a second.

The secret lies in the TI function which reads the interval clock in 'jiffies', or 1/60th second. This value is set to zero on power up and continually increments itself, except when the tape input/output routine is called. Try PRINT TI and RETURN followed almost immediately by another PRINT TI and RETURN. You will have two numbers giving the jiffy count at the moment of pressing RETURN.

The use in programs, refer to the following subroutine:-

```
1000 PRINT "CLS"
1020 T1=TI:REM**SET T1 AT START OF LOOP
1030 GET A$:REM**INITIATE ACTION TO BE TIMED
1040 T2=TI:REM**SET T2 TO FINISHING OR UPDATED TIME
1050 T=INT(((T2-T1)/60)*100+.5)/100:REM**CALCULATE TIME INTERVAL AND
  ROUND TO 2 DECIMAL PLACES
1060 PRINT "HOME":T:PRINT "CU: (7CR) SECS"
1070 IF A$=""GOTO 1030:REM**RETURN FOR NEXT ACTION
```

30 FOR X=22528 TO 22657:
 POKE X,7: PAUSE 5: NEXT X
 Note that the x value determines the amount of text to be displayed. POKE X,7 sets the memory address (x) for the screen text and 7 denotes the ink colour.

Also, try this:
 10 BORDER 0
 15 FOR N=0 TO 24
 20 LET L=USR 3582: PAUSE 1
 :NEXT N
 30 PAPER 7
 40 FOR X=0 TO 24
 50 LET L=USR 3582:PAUSE 1:
 BEEP .008,X: NEXT X
 Darren Virgo,
 Wickham,
 Newcastle upon Tyne.

Unlocking Sinclair Forth's potential

After buying the Sinclair Forth cassette, I realised that there was no INKEY\$ function other than KEY which returns the ASCII value of the key pressed to the stack.

The problem is that this waits for a key to be pressed, unlike INKEY\$ which does not.

To remedy this I set about using Forth's ability to redefine words and re-wrote KEY as follows:

```
: KEY 23560 C@ ;
```

so that it no longer waits. It uses the system variable LASTK and typing KEY. (ENTER) should make the computer respond with KEY. 13 OK, thirteen being the code for (ENTER). If KEY is used to detect a letter being pressed, the letter can be

printed onto the screen using EMIT.

Michael Perris,
 Great Bookham,
 Surrey.

Why not give your BBC a break?

Here is a way of turning all the keys (except BREAK and ESCAPE) on a BBC micro, into a kind of piano.

It's not exactly Beethoven but it does produce an intriguing effect. Try:

```
?&FE40=0
```

Another good trick is

*FX 254,7 which tells the computer that all the expansion slots are empty.

After you have typed this in, push CTRL and BREAK and then read the top of the screen.

Nicholas Booth
 Edgerton, Huddersfield,
 W Yorks.

Does your BBC deserve decorating?

The following little routine might appeal to those BBC owners who like to see their name in lights.

```
*KEY 101JBBC computer | _ |
  CYOUR name | _ | @ | EBASIC | _ |
  @ | G > | J | U | _ | A | G
```

Then each press of the BREAK key gives:

```
BBC COMPUTER
your name
BASIC
> _
```

This works by programming the VDU codes directly into the break key.

```
| _ | clears the text area and
  moves the cursor down one
  line.
```

```
| _ | moves the cursor to x, y
  (VDU 31)
```

```
| @ | C gives x=0, y=3
```

```
| @ | E gives x=0, y=5
```

```
| @ | G gives x=0, y=7
```

```
| J | U moves the text cursor down
  one line and delete back to
  the '>' symbol.
```

```
| _ | A | G positions the cursor at
  x=1, y=7 ie after the '>'
  symbol.
```

These additions do not affect the function of the BREAK key, they merely give a little personal adornment to the following display.

David Abbot,
 Horsham,
 Sussex.

Would the author of the Microwave on the left please send us his/her name and address.

Which book would your micro want you to buy? PCN's review page helps you choose.



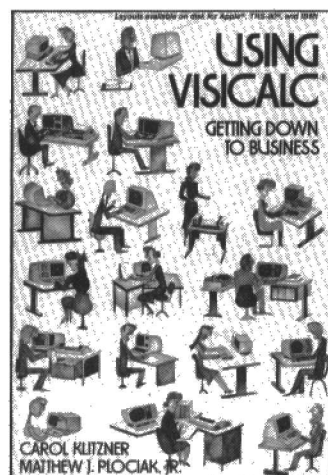
'Graphic Art for the BBC Computer — Turtle Graphics And Art' by Boris Allan, published by Sunshine Books at £5.95 (paperback, 112 pages)

At first sight this seems quite interesting, but delving deeper I found little more than a rather elaborate game with pretensions to grandeur.

That this introduces similar ideas to those propounded by Seymour Pappert in his book 'Mindstorms' is a tribute of sorts, and certainly Mr Allan takes a more practical line than Mr Pappert did, or possibly could considering the development of microcomputing at the time of writing.

The book is quite short, and academically interesting. But it's lack of origination left me dissatisfied.

PL



'Using VisiCalc' by Carol Klitzner and Matthew Plociak Jr, published by John Wiley at £13.95 (paperback, 269 pages)

This is yet another third-party tutorial on using the world's most popular program, (and one which was unfortunately not available to me). One of its

most unusual features is that the worksheets used as examples in this book, as in others of its type, are published on disk.

This is highly desirable, because although the complete models are listed at the back of the book, they are in several cases very large with many repetitive sequences, so copying them out would be excessively error-prone, albeit possible.

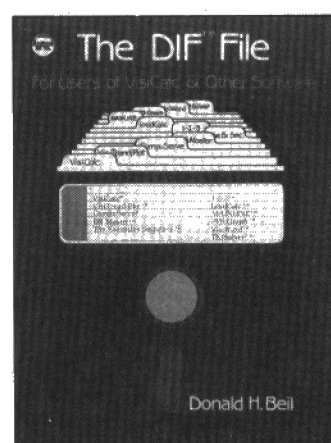
As models, they are quite good, if a bit unimaginative. On the one hand their very simplicity makes them relatively easy to understand, on the other they don't give much idea of the subtleties of VisiCalc.

The tutorial section of the book doesn't suffer the same fault as it's little more than a paraphrase of the VisiCalc documentation, which is itself particularly good.

Overall, I would suggest that the disk versions of the spreadsheets are rather more useful than the book, though at US\$39.95, it could be rather extravagant. Of course, you could type in the listings, but since the authors list them complete, with no attempt to develop some convention for using the /REPLICATE function, this is tedious.

It's a pity that a little more thought wasn't applied to the development of the idea before the authors rushed into manuscript.

RK



'The DIF File' by Donald Beil, published by Prentice/Hall at £13.55 (paperback, 233 pages)

There are some books which really should be on the shelves of any systems or application-programmer, and this is one of them.

Though the Data Interchange Format isn't formally

accepted as a standard by any major bodies, it has proved popular in the US, and at least over there, is considered to be a 'de facto' standard. However, it hasn't received the attention it should, at least not in Britain. It's obvious that the situation is different in the States, where a large number of programs either use DIF as an external utility or as a means of internal communication.

Part of the reason may be the (relative) lack of availability of the DIF Technical Specification in this country, which has meant that most information has to be gleaned at second or third-hand. Since the matter of interchanging data between different programs is a complex one, and involves many considerations not immediately apparent from examination of Basic listings, further obstacles have been put in its path.

This book, however, explains the whole subject lucidly with plenty of good examples, many of which have clearly been developed in real use. As a bonus the book gives some very useful hints and tips about how to use the DIF file-saving features of VisiCalc to overcome some of the limitations of the program.

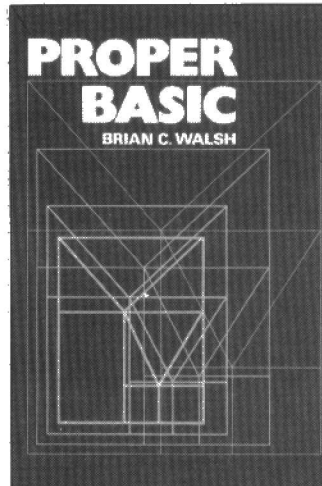
One case which often comes up, particularly in the early stages of developing a worksheet, is that a formula or value is incorrectly placed, resulting in circular or back-referencing calculations. Moving it is a problem, but by saving the worksheet in parts as DIF and VisiCalc-files, it can be dismantled and correctly re-assembled.

Though DIF is often associated with numeric data, largely as a result of VisiCalc, it also has provision for string-data, which makes it ideal for use with data-base and card-index programs, and this is also well covered.

The most interesting section is on the Special Data Values and User-Definable Items, which allow considerable expansion to the DIF, and suggest some interesting experimental ideas.

A very good book, which makes an important but neglected idea much more approachable. I can heartily recommend this treatise on DIF to any professional or serious amateur programmers.

RK



'Proper Basic' by Brian Walsh, published by John Wiley at £12.50 (hardback, 397 pages)

The title attracted me, and I hoped for a good meaty book on making Basic work reliably, but I was disappointed.

The book doesn't teach Basic 'properly' (whatever that means), since the only aspects covered are the 'legitimate' uses of the language.

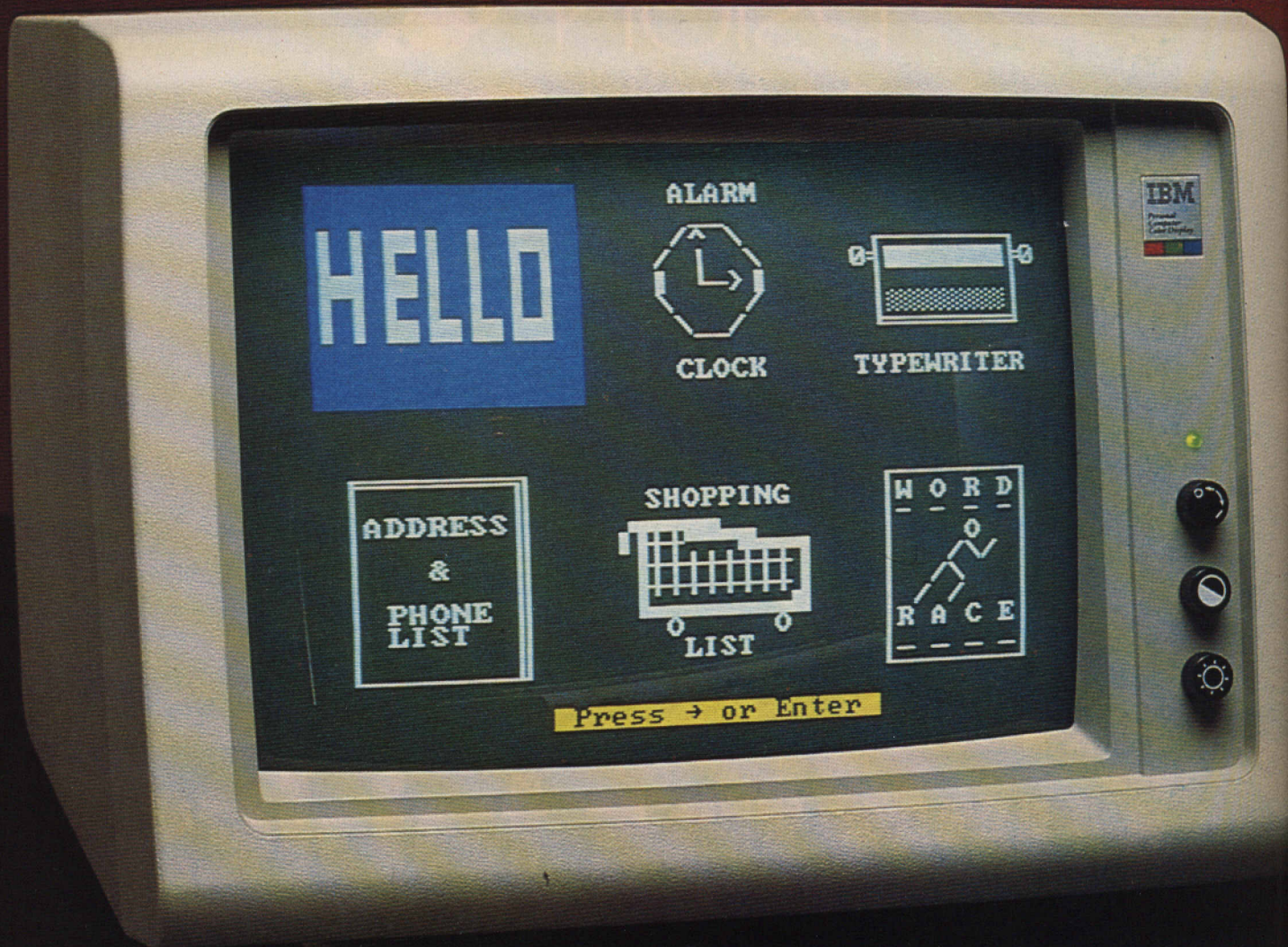
For example, it describes Sinclair ZX-81 Basic as well as the use of WHILE...WEND and such-like in GWBasic, however the author makes little attempt to show how you can synthesise such structures perfectly adequately in dialects which don't have them.

As a result, much of the code is clumsy and has many GOTOS and other constructs for which Basic has often, and justifiably, been criticised. It's the sort of book which unfortunate Computer Science students will be instructed to read, and in my opinion exemplifies the reasons why academic instruction in this subject is not the best way to learn.

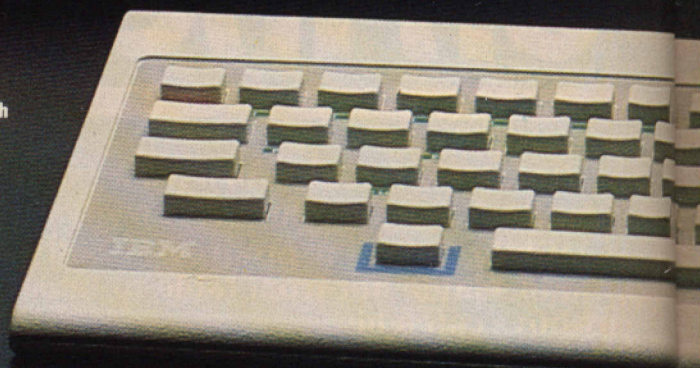
The problem is that 'real' programming as opposed to the 'theoretical' variety is as much a question of bending and creative abuse of the rules as it is of strict adherence to them, and books such as *Proper Basic* refuse to recognise this.

All is not lost, however, since the book does have some redeeming uses as a reference book concerning the differences between the many dialects of the language. Like many academic works it is extremely thorough and covers the full spectrum ranging from ZX-81 Basic through Pet and Microsoft Basics to Vax and ICL 2900 Basic.

RK



PC Junior featured in a configuration with an IBM monitor. There are questions surrounding the reliability of the cordless keyboard when working with a remote control TV.



At last IBM has released details of its PC Junior, the home computer version of the IBM PC, and allowed selected North American journalists a quick hands-on experience.

However the Junior, also dubbed the IBM Peanut, doesn't seem all it's cracked up to be. If it takes the home computer market by storm, it will be through its family connections, not because it possesses any outstanding qualities of its own. In the flesh, the Junior is rather dull, and horrendously over-priced.

The PC Junior looks rather like the IBM PC. The good news is that it does use the 16-bit 8088 Intel Processor and it does run the PC's operating system, PC-DOS although it is a revamped version called 2.1. The operating system comes 'bundled' with the machine. In the US it can also be bought as an extra for the IBM PC so that machine can run the Junior's applications programs.

Some of the bad news involves the Junior's keyboard which has been described as 'rather inadequate' by our North American correspondent. It is laid out a bit like the PC's except that it lacks the IBM's 10 special function keys. By way of

recompense, IBM has colour-coded the remaining 62 keys so special functions can be performed through a 'shift' operation.

The keys themselves are rubber domed arrangements rather than full-moving. This seems anomolous as it rules out effective word-processing (always a feature noticed by journalists, perhaps). But IBM does expect this to be a popular application and has already announced its Home Word package for the machine.

The costs, presumably cut by down-

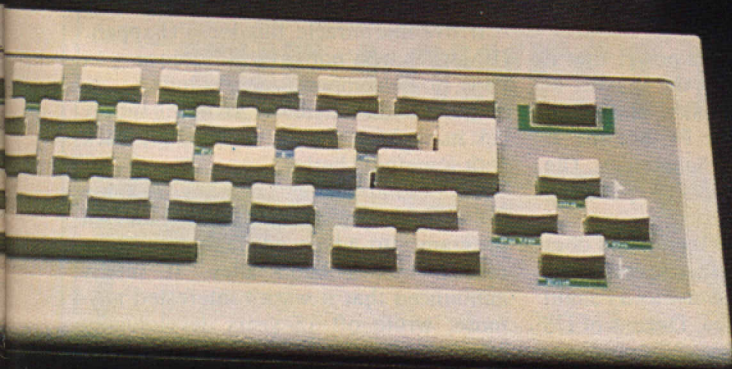
grading the keyboard, have been re-introduced in the form of an infra-red remote control system (the same technology that magically changes the channels on a TV remote control unit).

The keyboard can be used up to 20 feet away 'in line of sight' without a connecting cable. The system uses batteries to achieve the effect and turns itself off when the keys aren't being pressed. The batteries are supposed to last up to three months.

There are a few question-marks

Ian Scales inspects the features of IBM's latest progeny and is not impressed.

Peanut power



surrounding the reliability of the remote keyboard when competing with home-appliances on the same frequency. The fact that IBM also offers a conventional cable arrangement (costing US\$20) should tell us something, though it's always possible that users will want to manipulate the keyboard 'out of sight' of the receiver. Then again IBM expects that many of the Juniors will end up in classrooms where their IR signals would clash — cables here would be a necessity.

None of this explains why IBM bothered with an infra-red keyboard at all — we think it's an obvious gimmick but judge for yourselves.

There's more bad news surrounding upgradability. IBM naturally doesn't want the Junior to take sales away from the PC. This is a possibility if a clear upgrade path, (free of expensive obstructions) is opened up to the potential purchaser.

The Entry Model has 64K and runs cartridge software. It can display forty

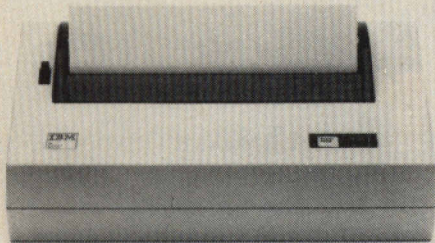
characters across a line and has variety of screen modes. 160×200 pixels are available in 16 colours, 320 by 200 in 4 colour mode and 640×200 in two colours.

The Expanded model comes with one 360K disk drive and 128K. Users can upgrade from Entry to Expanded — a 64K RAM cartridge and 80 column display costs \$140 and the disk drive costs \$480. If you really want to you can apparently expand the Junior to 640K of RAM though the dollars might all tot up to send shudders down the spine.

Monitors, of course, are an additional expense. Users of the Entry Model will obviously use a TV set to display their 40 columns of text, but the Expanded model can utilise IBM's colour monitor.

IBM has the software base off the ground already. There is a special Basic language, PCJr Basic, a Home Budget program, a Personal Communications Manager, the Home Word package, a range of games and a 'sampler' disk for the extended model which shows the users how to make the most of the system. An additional 'exploring' diskette shows them how the system works.

IBM has other options as well. In the US



The IBM thermal printer does seem to be priced reasonably at \$175. It's capable of a respectable 50 cps. Likewise the \$199 modem seems reasonable as it has auto-dial and auto-answer as standard features. The keyboard however is a disappointment being more calculator-like than full-moving.

◀ 19 there is to be a 300-baud hardwired modem with auto-dial and auto-answer, costing \$199, plus a \$175 50cps thermal printer with a \$40 adaptor.

The PC Junior is not expected to appear in this country for some time yet. The IBM PC took over a year to cross the Atlantic and although IBM always plays its cards very close to its chest, the odds are that the Junior will also take a leisurely passage.

The important thing is that the machine has finally surfaced. If you are wondering whether it was worth the wait the answer could well be no, but the PC Junior is an important machine simply because it has the initials of the world's largest computer company stamped on it.

The rumours that IBM was about to launch a home computer made the other US home computer manufacturers quake in their boots. Since the release of IBM's PC, the business/personal microcomputer market in the US has been transformed and many experts expected the same process to occur with the Peanut.

The PC has become the 16-bit micro standard there, and a host of IBM compatibles from both the US and Japan have sprung up to collect IBM's crumbs — some of the crumbs have been rather substantial, especially in the portable or luggable market. At the upper end of the micro market, if it's not IBM-compatible, it's at a very severe disadvantage.

By only releasing selected details of the Junior, IBM managed to ruin its competitors' Christmases. The stock exchange was already jittery about the future of the micro industry in the wake of Osborne's difficulties. Texas Instruments pulling out of the home micro market and losses reported by Atari, to name just a few reversals.

When IBM spent months being mysterious over a new release, investors wisely remained wary of investing in any of its competitors. According to some US spokesmen, Christmas buyers were also put off buying alternatives by IBM's decision not to start making the Jr available until early this year.

As far as users in the UK are concerned, the IBM PC Jr is bound to have some sort of impact. If things go the usual IBM way, the Junior and its compatibles will arrive on these shores eventually. The Jr will become a standard that can't be ignored by users simply because the software and expansion facilities will be huge. The pity is, the Peanut will be at least 40 per cent more expensive than it need be to prevent it from competing with the fully-blown PC.



Once Peanut owners reach the end of the Peanut's potential they will have to buy a new product to get any further — 'bait and switch' is the industry jargon for this marketing technique.

Such is IBM's status and power that it can actually afford to see the market in these terms. The possibility that users might opt for neither the PC nor the Jr doesn't seem to figure in the strategy. The annoying thing is that IBM is probably right.

Even if the Peanut is a lemon and does get a raspberry, the familiar scene seems set to unfold again. The overpriced Peanut will sell in huge quantities. Dozens of US software and 'third party' add-on manufacturers will produce supporting pro-

ducts. This trend will be encouraged as Peanut-compatibles arrive on the scene. IBM will sell even more Peanuts . . . and so it goes on.

If, by some miracle, this doesn't happen, IBM will hardly notice the difference — to IBM, home computers *are* Peanuts.

If the Junior fails to sell, IBM will simply lick its slight scratch . . . and come back with something better.

For example the company recently decided that a \$100 million-plus research program into advanced, high-speed processors was a blind alley. It simply announced that it wasn't interested anymore, wrote off 15 years development effort and reassigned over 100 scientists — Peanuts indeed!

SPECIFICATION Price

(US dollars) Entry model with cartridge port and 64K \$669, Expanded model with 128K and 360K disk drive \$1269, entry can be Expanded for \$620.

Processor

Intel 8088 16-bit

RAM

Entry 64K, Expanded 128K.

Graphics screen

160 by 200 pixels in 16 colours, 320 by 200 in four colours, 640 by 200 in two colours.

Keyboard

62 keys

Storage

Entry, cartridge. Expanded 360 360K 5.25 inch floppy disk drive, cassette interface.

Interfaces

Joystick ports, light pen socket, parallel interface, serial interface.

Operating system

PC-DOS 2.1

Distributor

IBM

Has language taken the path predicted for 1984? John Lettice says Orwell's that ends well.

Turning the tide

Welcome to 1984, the celebrated year of Newspeak.

And take a bow, all you owners of personal micros. You may not realise it but you are a bulwark against one form of Newspeak — computer jargon. This is the year by which English is supposed to have been distorted beyond recognition, but one of the most threatening distorting influences of recent decades, computerese, is making its last stand and looks like being overwhelmed.

The jargon that was once a form of gibberish spoken and understood only by a small elite is on its way out. English is making a comeback. You can all take some credit for this, but it's a back-handed compliment — it is the very popularity of micros that has undermined the jargon. We have taken what we need from its peculiar vocabulary and thrown the rest away.

There was a time, to be sure, when an understanding of core or binary digits would have qualified you for membership of a very exclusive club. This was when computer jargon was a creative art, finding names for new things. The BBC hardly had television in those days, let alone an overpriced micro; Sir Clive Sinclair had more hair.

As the years rolled by the jargon thrived and grew around computing like an impenetrable thicket. Acronyms sprang up everywhere, many of them with intimidating, science-fiction overtones — Cobol, for example, which may sound innocuous now but which can still send a shiver up the spines of those who knew it when it was all they had.

Some of the early machine names were acronyms as well — Leo, Eniac and so on — but in the Sixties names were dropped and numbers came into vogue, leaving people in no doubt that here was a subject best left to the experts.

The experts prospered. But where the Sleeping Beauty was content to lie around for years waiting for Mr Right to hack his way through the thicket, the computer industry found that the thicket was keeping it from Mr Right. Mr Right in this context was identifiable by his theoretical ability to afford a computer.

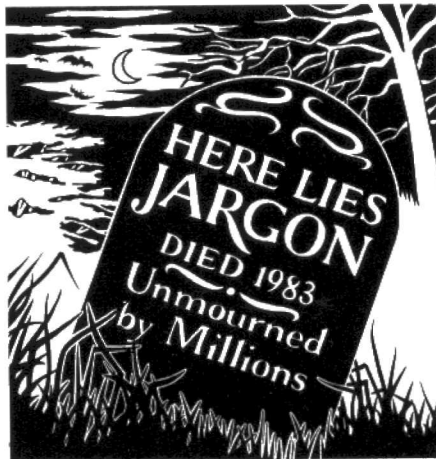
So it set about the thicket, made a few gaps, and fought its way out. The Seventies became the decade of the minicomputer, which carried computing to many more people than had been able to lay their trembling hands on it before.

The jargon wasn't laid waste during this period; if anything, a second protective layer was added. The original jargon had been baffling, but the second layer sounded as though it might be English. The expression 'man-machine interface' was rarely off people's lips, virtual memory

became concrete fact, but above all, this was the decade of the solution.

It could almost have been the chemical industry, there were so many solutions flying around in the late seventies. Integrated solutions, single-vendor solutions, vertical solutions, nothing was insoluble. The computer industry looked at businesses everywhere, and everywhere it saw problems — it would have been negligent not to offer solutions.

When it said 'problem' what it meant, of course, was 'job', and what a job needs is not a solution but simply a spot of elbow grease. But elbow grease is far too earthy a term to sell computers, so jobs became problems. This particular corruption of English still struggles on, especially in advertising, but bear in mind that when people talk about a solution looking for a problem what they mean is that it will take somebody with more money than sense to buy it.



Appropriately enough, it was a man by the name of Jobs who was largely responsible for exposing the pervasive lie of the 'problem'.

With microcomputers beginning to sell in thousands, then in hundreds of thousands, then in millions, it becomes obvious: surely not all of these people can have problems? Not all of them have jobs either, but that is by the by.

The Eighties is the decade of the micro. At first micros went only to hobbyists and universities, where people understood the jargon and wore their understanding like an old school tie. But the trouble with something that sells for, say, \$500, as opposed to a \$500,000 mainframe, is that you have to find hundreds of people willing to buy them to make the same profit. If incomprehensible jargon has left you facing a hostile and anxious market which worries that computers are bent on world domination, something has to be done about the jargon. Something was. The Californian garage proprietors were not about to let a misapprehension stop them

from spreading the manifold benefits of computing to all humanity.

The jargon was not so much ditched as side-stepped. Computers acquired names again — fresh fruit proved especially popular — and the mysterious things they contained acquired one name — the chip. The difference between memory, processors, and logic gates became irrelevant. Software became 'user friendly', an impressive, though vaguely bogus, way of saying straightforward. The jargon grew in a new and fruitful direction; it became homely, which was no surprise since the micros themselves were heading in the same direction.

You can still see this process at work — take for example the latest development in the user friendly man-machine interface, the windows/mouse combination.

In the bad old days the mouse would have been given some more or less meaningless acronym — Cursor Orientation Device (Cod) perhaps. Even so, there would have been die-hards muttering darkly about the dangers of using a name that ordinary folk could understand. To a 1984 businessman it will be a matter of complete indifference whether he's pushing a mouse or a cod across his desk, but the mouse, furry and warm-blooded, scores over the cod in the homeliness stakes.

Windows are a different kettle of fish. For some reason software has never lent itself to acronyms as readily as hardware. Windows would have been called something like SSSS (Screen Segmentation Software System) in the days when men were men and mice scuttled about behind the wainscoting. SSSS would not have meant anything to anybody, but when used in conversation it could have indicated the scorn in which the speaker held the uninitiated. Nowadays, windows are perfect. All homes have them.

The phase we're entering now might be described as the Twilight of the Cods. The pace of computer development hasn't slackened but the old jargon is dying out faster than it can be replaced. Technology becomes obsolete so quickly that jargon sounds dated sometimes within a day or two of being invented. New technology, on the other hand, tends more and more to use recognisably English words.

Certainly the words it borrows are usually given a different meaning, but the point is that the flow has been reversed — technology now relies more on English to make itself understood, instead of concocting drivel to make itself unintelligible. Jargon that survives has found its way into dictionaries and gained respectability as part of the language. English is a broad church able to accommodate all sorts of heresies. God Save the Queen's English.

Put weight on your characters with Kevin Ball's routine for double-width letters.

Spectrum s-t-r-e-t-c-h

This routine shown in the disassembly listing enables the Spectrum to display double width characters. These characters make very effective titles, screen headings, and also input prompts; being larger the user's attention is drawn to them quicker.

The method of implementing the double width characters is as follows: the coordinates of a particular screen location are POKED into two buffers, and then the machine code routine is called. This routine examines the bytes of the character in the character square and expands them horizontally to stretch out the character.

NB: Care must be taken when planning displays with double width characters as each expanded character takes up two character blocks horizontally next to each other. This means that when printing a string of characters, they must be printed in every other character position. The easiest way is to use a FOR...NEXT loop thus:

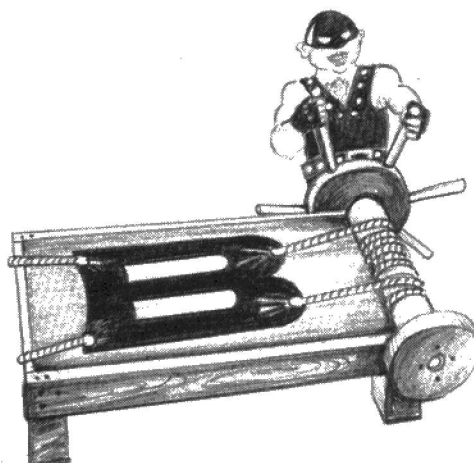
```
10 LET a$="STRING"
20 POKE 23729,5
30 FOR f=1 TO LEN a$
40 POKE 23728,f*2
50 PRINT AT 5,f*2;a$(f)
60 RANDOMIZE USR double width
70 NEXT f
```

It should also be noted that as there are 32 columns in the Spectrum's display only 16 double width characters can be fitted onto each row. The short program above illustrates the point made earlier: to display a double width character it is first necessary to print the character in the normal way and then to call the machine code routine. This means that you can expand anything that you care to put into a character block.

The alternative would be for the routine copy bytes from the character set in ROM to the display file in RAM. This method limits you however to ROM based characters which are the space (code 32) through to the copyright symbol (code 127).

The machine code routine preserves the attributes of the printed character and uses them for the new expanded character. The routine also includes range checking for the character position that is POKED into the buffers. The routine has been written so that it is totally relocatable ie it doesn't matter where you put it in RAM, it will still work. For integration into a Basic program you may find it most convenient to POKE the codes into a REM statement at the start of your program. The locations of the buffers used to accept the print position remain unchanged wherever the routine is placed.

If you enter the mnemonics into an assembler then you will find it easier to modify the routine and adapt it to your own needs. It is possible to use this routine in the same demonstration program as shown last week for the double height characters. All you have to do is replace the old data lines with the new bytes for the double width



characters. No other alterations are necessary.

Enlarged characters

It is possible to use the double width characters routine shown here with the double height characters routine shown last week to produce extra large characters which take up four character positions. Both routines have to be present in memory, and one has to be called twice for each character printed. To produce the enlarged characters, add this extra line to the program shown above:

```
65 RANDOMIZE USR double height: POKE 23728,f*2+1: RANDOMIZE USR double height and (making sure both routines are present in memory) run it again.
```

```
LD BC, 237 75 176 92
LD A, C 121
CP 31 254 31
JR C, cont a 56 1
RET 201
cont a: LD A, B 120
CP 22 254 22
JR C, cont b 56 1
RET 201
cont b: CALL CL-ADDR 205 158 14
LD B, 0 6 0
ADD HL, BC 9
PUSH HL 229
LD C, 8 14 8
bgloop: LD A, (HL) 126
INC HL 35
LD (HL), 0 54 0
LD B, 4 6 4
loop a: RRCA 15
JR C, one 56 6
RRC (HL) 203 14
RRC (HL) 203 14
SET 7, (HL) 203 254
SET 6, (HL) 203 246
next a: DJNZ loop a 16 237
DEC HL 43
LD (HL), 0 54 0
LD B, 4 6 4
loop b: RRCA 15
JR C, two 56 6
RRC (HL) 203 14
RRC (HL) 203 14
SET 7, (HL) 203 254
SET 6, (HL) 203 246
next b: DJNZ loop b 16 237
INC H 36
DEC C 13
JR NZ, bgloop 32 203
POP HL 225
LD A, H 124
RRCA 15
RRCA 15
AND 3 230 3
OR 88 246 88
LD H, A 103
LD A, (HL) 126
INC HL 35
LD (HL), A 119
RET 201
999
```

```
10 REM at least 92 characters (3 lines)
20 LET a=5+PEEK 23635+256*PEEK 23636: LET aa=a
30 READ z: IF z<>999 THEN POKE a,z:LET a=a+1: GO TO 30
40 DATA 237,75,176,92,121,254,31,56
50 DATA 1,201,120,254,22,56,1,201
60 DATA 205,158,14,6,0,9,229,14
70 DATA 8,126,35,54,0,6,4,15
80 DATA 56,6,203,14,203,14,24,8
90 DATA 203,14,203,14,203,254,203,246
100 DATA 16,237,43,54,0,6,4,15
110 DATA 56,6,203,14,203,14,24,8
120 DATA 203,14,203,14,203,254,203,246
130 DATA 16,237,36,13,32,203,225,124
140 DATA 15,15,15,230,3,246,88,103
150 DATA 126,35,119,201
160 DATA 999
170 INPUT "Character? ";a$
180 INPUT "Row: ";r
190 INPUT "Column: ";c
200 POKE 23729,r: POKE 23728,c
210 PRINT AT r,c:FLASH 1;a$(1)
120 RANDOMIZE USR aa
130 GO TO 70
```

To the left is the Basic loader and demonstration program. Above is the disassembled machine code listing.

Solve your presentation problems with a series of programs from B. Jaques.

Mind your Xs and Ys

The Oric's TAB problem is well known. TAB(N) is actually TAB(N-13) for available columns on one line, so that

TAB(17) = TAB(4), and anyway it does not TAB but SPACE. That is, it does not jump the cursor but prints blanks on the way to

the PRINT position, so that TAB(17) = SPC(4).

Finally, it forgets where the left hand margin start is, Oric's TAB is SPC(N)-13).

That's the situation on my June 1983 Oric. Try Listing 1 to check out how TAB works on your Oric.

A true TAB function following a PRINT command is a way of presenting a command PRINT AT x on a given line and is a very useful tool in storing and number presentation format. So the Oric does not have a true TAB, but it has facilities which let you provide alternatives.

In this article the x coordinates/printing column numbers are those of the Oric, shown below, unless specified differently.

(Column sequence) 1 2 3 4 5 6 . . . 40

Oric number N/A 0 1 2 3 4 . . . 38

(See manual p154). Thus SPC(4) would cause printing to commence in column 5, as would a true TAB(4), in the apparent seventh column along.

One TAB replacement function has been suggested by C Thompson (PCN issue 13, page 16) in the form of SPC(N-POS(0)) to replace TAB(N). Here are four other methods, each with their particular features and advantages, so that with the five techniques one should be able to cope.

An important criterion for a replacement TAB is that the cursor should subsequently behave as after a PRINT command — so the PLOT command is not regarded as a true alternative, although of course it is extremely valuable in its own right. I also wish to stay in fundamental Basic operations for a replacement function, so I am not including the Oric PRINT AT function which may be constructed in code from the manual (page 128), although again this is an extremely valuable function, behaving as a PLOT + cursor retention command.

SPC (N-POS(0))

Listing 2 provides a demonstration of the function and illustrates the importance of getting the numbers correct.

POS(0) is a function that returns the current x position at the cursor and is thus related to PEEK (617) (see later for PEEK/POKE 616 and 617.) In the function POS(0) the brackets are required (amend the manual P141), but the argument is a dummy, any true alphanumeric character will do, changing the number does not change the datum column 0. So SPC(N—current cursor position) gives the function SPC(x) to print x spaces further to the right — providing the numbers are right.

Note that POS(0) uses the left most numbered columns as datum, Oric's 0 column. Thus, if the cursor rests at position 10 following a string of length 9, then POS(0) will return 11. This is illustrated in the demonstration program.

Since the printing and POS(0) are one

PROGRAM 1

```
0 REM SAVED AS ORICTABDEMO
1 REM ILLUSTRATES ORIC TAB FUNCTION
2 REM B JAUQUES 1983
5 CLS
9 REM FILL SCREEN WITH X, THEN HOME
10 GOSUB 150
20 FOR R=1 TO 20: R$=STR$(R)
25 PRINT TAB(R) "TAB("R$") TAB(R+5) "00"
30 IF SCRN(1,R)=32 THEN GOSUB 200
35 NEXT
40 PRINT: GOSUB 250
45 PRINT: PRINT "TAB(R) IS PRINTED BY TAB(R)"
50 PRINT: PRINT "00 IS PRINTED BY TAB(R+5)"
55 PLOT 12,6, CHR$(1)+"PRESS A KEY TO CONTINUE"+CHR$(0)
60 GET C$
65 GOSUB 150: GOSUB 250
70 H$="HELLO": H=LEN(H$)
75 T$="THERE": T=LEN(T$)
80 P$="PCN": P=LEN(P$)
85 PRINT SPC(1) H$ SPC(H+2) T$ SPC(T+2) P$+" L85"
90 PRINT TAB(13+1) H$ TAB(13+H+2) T$ TAB(13+1+H+2) P$
95 PRINT SPC(1) H$ SPC(H+2) T$ SPC(T+2) P$
100 PRINT TAB(13+1) H$ TAB(13+H+2) T$: PRINT TAB(13+T+2) P$+" L100"
105 GOSUB 250
120 END
150 FOR R=1 TO 10: PRINT "X": NEXT
155 PRINT CHR$(30): RETURN
200 IF C$="1" THEN N=1-R
210 PRINT TAB(13+12+R+N) CHR$(11) "TAB("R$") IS TAB("STR$(R+N) )"
220 F=1
230 RETURN
250 PLOT 0, PEEK(616)-1, CHR$(1)
252 PRINT "1234567890123456789012345678901345678"
260 RETURN
```

PROGRAM 2

```
0 REM SAVED AS TABREF1DEMO
1 REM B JAUQUES 1983
2 REM SPC(N-POS(0)) IDEA BY C THOMPSON
3 REM PCN, JUNE 3'83 P16
5 CLS
10 A$="THIS IS A": A=LEN(A$)
15 B$=CHR$(129)+"DEMONSTRATION"
20 PRINT "POS(0) PK(617) R(LOOP) A+R+POS"
25 FOR R=5 TO 1 STEP -1
30 GOSUB 100
35 PLOT 0, PEEK(616)-1, 4
35 PRINT A$: P=POS(0): PK=PEEK(617)
40 PRINT SPC(A+R-P) B$
45 PRINT P, PK, R, A+R-P
50 NEXT
55 GOSUB 100
60 END
100 PLOT 0, PEEK(616)-1, 1
110 PRINT "12345678901234567890123456789012345678"
120 RETURN
```

PROGRAM 3

```
1 REM SAVED AS TABREF2DEMO1
2 REM DEMO 1 FOR ERSATZ TAB FUNCTION
3 REM B JAUQUES 1983
4 REM USE OF CHR$(11) TO TAB FROM ONE LINE BELOW
5 REM TAB'S *S TO B$, TO A$
10 CLS: B$="IS QUITE NICE": B=LEN(B$)
20 FOR R=1 TO 5
25 READ A$: A=LEN(A$): PRINT A$
28 REM SPC ALONG UNDERNEATH A$, THEN COME UP WITH B$
29 REM FOR DEMO PURPOSE LINES 30 & 40 ARE SEPARATED
30 PRINT SPC(A+1) CHR$(11)+B$
39 REM SPC LONG UNDERNEATH A+B$ THEN UP CURSOR, PRINT COLOUR CODE
40 PRINT SPC(A+B+1) CHR$(11)+CHR$(129)
48 REM PRINT * TO A RIGHT MARGIN
49 REM COULD USE A SLICED STRING INSTEAD OF LOOP
50 FOR I=(A+B+2) TO 35
55 PRINT SPC(I) CHR$(11)+"*"
60 NEXT I
75 NEXT R
80 DATA JOHN, BETTY, ELIZABETH, IAN, BARTHOLOMEW
```

column 'out' the minimum spacing, zero, between two printings is $SPC(N+1-POS(\emptyset))$ where N columns have already been used. Anything less than N+1, however derived, will result in a negative spacing which is not allowed — look for the error message.

In the demo program, B\$ has a 'printed' invisible colour character as its first unit; remember this when studying the screen presentation.

CHR\$(11), 'cursor up'

This is useful for normal printing in the descending manner providing that there is no important material in the line below that which is to be tabbed. A further valuable use is to insert a variably TABed PRINT between two or more fixed position 'prints' or borders.

One uses SPC(N) but on the line below that required. The cursor is then brought up with the non-printed code CHR\$(11) to print on the particular line. If a subsequent line feed is allowed then the procedure can be repeated along the line up to the right hand limit. If the spacings permit one can introduce and cancel/change central codes and attributes along the way as in normal printing.

The technique is illustrated in the demonstration listings 3 and 4. Listing 3 is deliberately complex to demonstrate the method, it is well appreciated that the result could be achieved in a simpler way. The stock B\$ is TABed after a DATA produced A\$ of variable length, subsequently red stars are TABbed to a constant right hand margin.

Listing 4 shows the technique used in a way that has been useful in a game situation, amongst others. Here, fixed vertical borders of varying colour blocks are printed first, then two strings are TABed, separately for demonstration purposes, between the borders.

CHR\$(30) in columnation TABing

Especially suitable for columnation of material is the use of CHR\$(30), which is Oric's reasonably well hidden non-printing code for HOME. This returns the cursor to \emptyset, \emptyset with line feed (unless suppressed), effectively putting the cursor at 1,1.

To produce columns Oric is made to produce one whole column at a time, from top to bottom, with the first set on the *right-hand side* using an appropriate SPC(N). The cursor is then brought HOME, line feed adjusted and SPC computed to produce the next column to the left and clear of the first one — and so on.

If the rows of the columns need to be identified by sequence numbers (1,2,3 — n) then you will realise that a problem occurs at 10 and at 100 because of the increase in length of the number. One simple way round this problem, a form of TABing after a numbers is to use $INT(\log(n))$. The integer part of $\log(\text{base } 10)$ of \emptyset to <10 is \emptyset , $10-<100$ is 1, and so on so that $SPC(1-INT(\log(n)))$ will give you 2 apparent spaces after units and 1 space after tens (allowing for the apparent space

PROGRAM 4

```
1 REM SAVED AS TABREP2DEMO2
2 REM DEMO 2 FOR ERSATZ TAB FUNCTION 2
3 REM B JAUQUE 1983
4 REM FIXED VERTICAL BORDERS & VARIABLE PRINTING BETWEEN
10 CLS:PAPER0:INK6
20 A$="HELLO":B$="THERE"
30 FORR=1TO20
39 REM PRINT COLOURED BORDER UNITS
40 C=RND(1)*7+129
50 PRINTCHR$(C)+CHR$(126)SPC(32)CHR$(C)+CHR$(126)
59 REM PRINT STRINGS IN 2, FOR DEMO, TAB STAGES
60 A=RND(1)*15+4
70 PRINTSPC(A)CHR$(11)+CHR$(129)+A$
80 PRINTSPC(A+LEN(A$)+1)CHR$(11)+CHR$(132)+B$
90 NEXT
```

PROGRAM 5

```
1 REM SAVED AS TABREP3DEMO
2 REM B JAUQUES 1983
3 REM ERSATZ TAB SYSTEM FOR COLUMNATION
4 REM USES CHR$(30) HOME, COMPUTED SPACING AND INT(LOG(N)) SPACING
5 REM NOTE SPACING FUNCTIONS SEPARATED FROM PRINT LINES, USE:
10 CLS:PRINT
19 REM LOOP FOR COLUMNS, BACKWARDS
20 FORR=4TO0STEP-1
22 T=7*R+2
23 PRINTSPC(T)"RUN"5-R
24 REM COLUMN DEPTH
25 FORN=1TO20
29 REM 4 PLACE RANDOM NUMBER FOR COLUMNATION
30 X=INT(RND(1)*10000)/10000
34 REM FOR LEFTMOST COLUMN FIRST PRINT SEQUENCE NUMBER THEN RELEV
ANT SPACE
35 IFR=0THENPRINTNSPC(1-INT(LOG(N))):GOTO45
39 REM OTHERWISE COMPUTE INTERCOLUMN SPACING
40 PRINTSPC(T):
44 REM PRINT NUMBER, SEE 200-210 FOR TRAILING ZEROS
45 PRINTX
50 NEXT N
54 REM WHEN FINISHED AVOID HOME
55 IFR=0THEN70
59 REM HOME CURSOR, LOOP TO NEXT COLUMN
60 PRINTCHR$(30)
65 NEXT R
70 PRINT:PRINT:PRINT"NOW WHAT?"
100 REM FOR TRAILING ZEROS INSERT AT 32 THE LINE AS IN 110-REM
110 REM X$=STR$(X):IFLEN(X$)<6THENREPEAT:X$=X$+"0":UNTILLEN(X$)=6
120 REM AND REPLACE 45 BY ?X$
```

used by the invisible decimal point).

If you expect to go up into the hundreds then the standard form would be $SPC(2-INT(\log(n)))$ for consistent columnation. Thus the general function is $SPC(S-1-INT(\log(n)))$ function Listing 5 uses five runs of generated random numbers (<1), numbers.

As a demonstration of method 2 and the $INT(\log(n))$ function listing 5 uses five runs of generated random numbers (<1), truncated to 4 decimal places, in columns of 20. The printing sequence of columns is from right to left to avoid deletion of previous material since normal SPCing is used. If you wish to title columns then strictly speaking column 1 or run 1 is on the right.

Since CHR\$(30) is followed by line feed, preliminary alignment is achieved by a PRINT in line 10. When using titles further line feed alignment is required after HOME.

Note that HOME has to be avoided after the final column, otherwise further printing will be over the columns.

CHR\$(9), 'cursor right'

Methods 1 and 2 have been very useful, but since they rely on SPC fundamentally they do not possess the 'leaping over' quality of a true TAB function. When the screen is blank except for the material that is currently being printed this difference may not be noticeable or of importance. However, method 3 is a technique that 'drops' your material into the chosen slot without disturbing anything else — and it keeps control of the cursor. It is not a PLOT!

Create a string of non-printing cursor-right characters, CHR\$(9), in the initialisation section of a proper program. When TAB is required, call up the string and take and print as much of it as you need to TAB by using the LEFT\$ function, and add on the material you want to PRINT. If you expect to require 2 or more TABs in a line, extend the system by incorporating a subroutine which calculates the string slice required using POS(\emptyset), since Oric knows where the cursor is on the line in question.

PROGRAM 6

```

0 REM SAVED AS TABREP4DEMO
1 REM ERSATZ TAB FUNCTION 4
2 REM B JAKUES/M LEACH 1983
3 REM USES CHR$(9), CURSOR RIGHT, IN STRING SLICES
4 REM DOES NOT CAUSE BLANK OVERPRINTING
5 CLS:PAPER7:INK0
9 REM FILL SCREEN WITH X, THEN HOME
10 FORR=1TO1026:PRINT"X";:NEXT
12 PRINTCHR$(30):PRINT:PRINT:PRINT
14 REM SET UP STRING OF CHR$(9)'S
15 FORR=1TO39:CR$=CR$+CHR$(9):NEXT
19 REM DEMONSTRATION STRINGS
20 A$="CAN YOU":B$="FIND US?"
22 GOSUB95
24 REM SPECIFY TAB AS T', GO TO S/R
25 T=12:GOSUB100
30 PRINTA$:
35 T=20:GOSUB100
40 PRINTB$:PRINT
44 REM FURTHER DEMO
45 FORL=1TO5
50 T=RD(1)*10+2:GOSUB100
55 PRINTA$:
60 T=T+RD(1)*5+1+LEN(A$):GOSUB100
65 PRINTB$:INT(T)
74 REM PRINT COMPUTED T' AT TB POSITION
75 T=T+1+LEN(B$):GOSUB100
80 PRINT CHR$(132)TCHR$(128)
85 NEXT
86 GOSUB95:PRINT
89 REM DEMO OF EXISTING TAB FUNCTION
90 PRINTTAB(25)A$+" "+B$
92 END
94 REM COLUMN LABELLING STRING
95 PLOT0,PEEK(616)-1,1
96 PRINT"12345678901234567890123456789012345678"
97 RETURN
99 REM TAB BY STRING SLICING CR$
100 TB=T-POS(0)+2
110 PRINTLEFT$(CR$,TB):
120 RETURN

```

PROGRAM 7

```

0 REM SAVED AS TABREP5DEMO
1 REM ERSATZ TAB FUNCTION 5
2 REM B JAKUES 1983
3 REM USES PEEK, POKE 617 FOR X POSITION OF CURSOR
4 REM DOES NOT CAUSE BLANK OVERPRINTING
5 CLS
9 REM FILL SCREEN WITH X, THEN HOME
10 FORR=1TO1026:PRINT"X";:NEXT
12 PRINTCHR$(30):PRINT:PRINT:PRINT
19 REM DEMONSTRATION STRINGS
20 A$="CAN YOU":B$="FIND US?"
22 GOSUB150
24 REM SPECIFY TAB AS T', GO TO S/R
25 T=12:GOSUB100
30 PRINTA$:
35 T=20:GOSUB100
40 PRINTB$:PRINT
44 REM FURTHER DEMO
45 FORL=1TO5
48 GOSUB150
50 T=RD(1)*10+2:GOSUB100
55 PRINTA$:
60 T=T+RD(1)*5+1+LEN(A$):GOSUB100
65 PRINTB$:
74 REM PRINT COMPUTED T' AT TB POSITION
75 T=T+1+LEN(B$):GOSUB100
79 REM T-2 BECAUSE OF T+2 IN 100
80 PRINT T-2
82 NEXT
85 REM DEMO OF IMPROPER (LOW) VALUE FOR T', 16 AFTER 14
86 PRINT"TAB 14/16":T=14:GOSUB100:PRINTA$:
87 REM SEE L 79
88 T=16:GOSUB100:PRINT" "+B$+"2ND TAB" T-2
89 REM DEMO OF EXISTING TAB FUNCTION
90 PRINTTAB(25)A$+" "+B$+" L 90"
96 END
98 REM ALTERS CURSOR POSITION TO TAB WITH A POKE
99 REM 100 CHECKS FOR AN OVERPRINTING TAB VALUE, ALTERS TO MINIMUM
VALUE
100 T=T+2
102 IF T<PEEK(617) THEN REPEAT: T=T+1: UNTIL T=PEEK(617)
104 REM TURN OFF CURSOR, 115 TURNS IT ON
105 PRINTCHR$(17):
110 POKE617,T
115 PRINTCHR$(17):
120 RETURN
149 REM COLUMN LABELLING STRING
150 PLOT0,PEEK(616)-1,1:PRINT"12345678901234567890123456789012345678"
155 RETURN

```

Listing 6 demonstrates the full method. It is important to note that since CHR\$(9) is a non-printing character it really is put at $x = (-1)$ — the N/A column, on a line by a PRINT command, so the string slices also begin at $x = (-1)$. Since observed printing begins at $x = (-1)$ you will have to add 2 to the apparent TAB required (SPC(0) puts the cursor at 1).

The central section of the demo-program computes a TAB value and prints that value. Note that here, as in several other instances where non-integers are unrealistic operators, the Oric subjects the number to an automatic INT(N) function. Particularly note where printing starts, using the printed column guide. As programmed the printing starts one column after the TAB value. This is readily altered if required. The last printed string in the demonstration shows/checks the overprinting effect of the existing TAB function (even when adjusted from -13).

POKE(617), the 'x' position address

This also drops the material to be printed into the allotted position without overprinting blanks on its way, and keeps control of the cursor.

Memory locations 617 and 616 hold the current x,y positions of the cursor in TEXT, LORES-0 and -1 modes and the text window (from $y = 1$ to 3) in HIRES mode. Thus you can PEEK and POKE here. For the purpose of TABing, it is likely that the cursor is already at or can be line fed to the required y position so only x need be considered.

POKE 617 with required TAB spacing, again noting that the number should be 2 more than the equivalent SPCing. As before one can incorporate a subroutine to have succeeding TABs on one line.

To avoid overprinting one needs to check that the proposed TAB is not less than the present cursor position. The program contains a 'wrong' set of TABs in lines 87, 88, and hopefully line 100 will give a minimum clearance. Put REM in front of line 100 to temporarily remove it and RUN again. Note that there is a space 'positively' printed between the two strings.

On my Oric the first POKE produces a cursor block that can be avoided by switching off the cursor symbol with CHR\$(17). If required it can be restored with a succeeding CHR\$(17). Listing 7 illustrates these features.

It is apparent that method 5 is a semi-PRINT AT function (given y, PRINT AT x). If you require a full PRINT AT (x,y) command, then details for the machine code program necessary are in the Oric manual (page 128, chapter 13). It seems that you could knock up a version by extending the POKE in method 4 to the y position at location 616.

In a sense the valuable PLOT command is a PRINT AT (ignoring all the details of different character handling) command that subsequently loses the cursor to HOME. Well, one could always put the cursor back where required by POKE 617, 'x'; POKE 616, 'y'.

Richard Gold looks at a new graphics pad for the BBC Micro user.

Finer artists

Graphics pads have joined the tumbling price phenomenon. The latest of the new low-priced products is the British Micro Grafpad at under £150. It brings the price into a range where home users can enjoy screen art, and is available now for the BBC. Versions are promised for the Spectrum and Commodore 64.

The model reviewed included pre-release copies of the software and manual. Designed for educational use as well as for computer aided design, and in many ways similar to the Watford Beebplotter (Issue 26), the Grafpad provides an escape for the BBC user from the long-winded MOVE, PLOT and DRAW commands.

The graphics pad, and its accompanying software cassette, allow you to draw your own designs or trace the outlines of maps and pictures. These can be saved to disk or tape, and copied through a printer.

First impressions

Once you have waded through the excessive protective polystyrene which, as well as surviving the British postal system would presumably keep both device and user afloat in the roughest of seas, you come across a piece of hardware that looks not only well made, but also rather attractive.

The Grafpad consists of a tablet and detachable pen. The tablet has a grid for drawing which has a size of 320 by 256 pixels and a green menu area, the use of which is not specified; both are protected by perspex. The pen has a microswitch nib, looks like a dentist's drill, and is tough and reasonably durable.

Documentation

The user manual is little more than an introductory booklet. It looks cheap (or, if you prefer, functional) and does not even give the full range of commands available in the introductory software. A definite plus is the program listings at the back of the manual, which let you write programs that use the Grafpad.

However, the manual seems little more than a single clue in a puzzle, the object of which is to discover how the Grafpad works, rather than a complete operational guide.

In use

Perhaps the most important point to be made is that you need a disk drive in order to operate the functions with any speed. This is because when saving a screen, the whole of the screen memory, a massive 20K in MODE 1 high resolution graphics, is stored. This, of course, is very tedious using cassette, though not when using disk.

However, the Grafpad is easy to install: all you need is a BBC with 32K and a user port. The software package, which is included in the price of £148.75 (inc post,

packing and VAT), effectively turns the Grafpad into nothing more than a sophisticated sketch pad — an expensive toy.

Nevertheless the range of functions is impressive. The program operates in Mode 1 only, but though only four colours can appear on the screen at a time, the full BBC palette of 16 colours is available. Furthermore, they can be swapped to try different colour schemes.

It is disappointing that the keyboard must be used in selecting commands, especially since the menu area on the tablet is not used. However, using the keyboard, and the pen on the grid, you can draw rectangles, triangles and lines quickly and easily, with rubber-banding.

Circles are drawn by fixing the centre and tracing a radius — the computer does the rest, though the circles are not as round as they could be. The freehand drawing function is good for tracing pictures, though a little jittery and therefore slightly inaccurate. You can add text to your design with the WRIGHT function which works better than it is spelt.

There is also a clever erase function which draws the background colour over the part you want to delete. This gives much more control than most other programs.

A serious fault in the Grafpad is the lack of error trapping, particularly as the key to choose a brush colour is next to that used to clear the screen. This means a slip of the hand can destroy your masterpiece.

The FILL command lets you colour in parts of the picture. Sometimes during

testing the colour leaked out of what should have been an enclosed area and filled much of the screen.

British Micro sells, for an extra £20.70, a CAD program to use with the Grafpad. The ability of this program to create multicoloured and high resolution characters hides the fact that this is not really a computer aided design package at all. You can create only very small characters, and the only other creative functions are line drawing routines. Furthermore, on the review copy the SAVE and LOAD functions did not work.

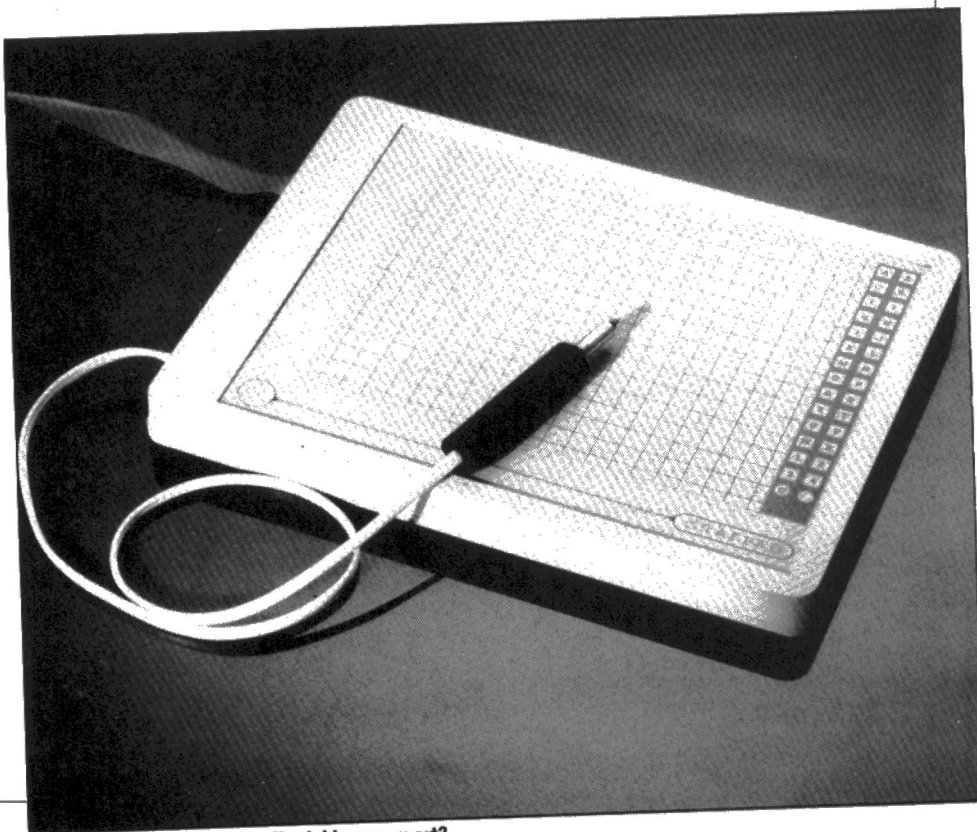
Perhaps the faults of the software should not be overstressed. Indeed, given these faults, the Grafpad itself performed extremely well. Certainly, there are inexplicable features to it. The grid itself is odd as it has no relation to the grid provided in the CAD program. Also there seems no good explanation why the pen is detachable.

Despite the perspex cover the designs can be reasonably, though not completely, accurate. And if you lack space, the Grafpad is big enough, and solid enough, to sit quite comfortably on your lap.

Verdict

The Grafpad is well made but rather expensive. It is certainly not up to the standard required by a design studio, and probably too expensive for the home market. If a school were to consider a product like this, it would probably get better value for money with one of the keyboard-based programs.

Product Grafpad **Manufacturer** British Micro, Watford, 0923-48222 **Price** Grafpad: £143.75 inc VAT; CAD software: £20.70 inc VAT **System** BBC Micro (Commodore 64 and Spectrum versions promised)



The British Micro Grafpad: affordable screen art?

This printer has features hitherto only available for well over its £240, says Roger Howorth.

The Walters WM80 is the cheapest printer in its class, at £240. Introduced as a direct competitor for printers like the Epson RX80 and the CTI CP80, the WM80 shows how quickly the price of printers is falling.

First impressions

The Walters WM80 comes in a plain cardboard box just too large to tuck under your arm. However, the printer itself is compact, measuring 377mm × 295mm by 125mm overall, and is pleasingly designed. It comes with lots of polystyrene packing, a paper feeding rack and even a black carbon ribbon cartridge but, alas, no plug.

There are the usual three lights, signalling Power, Ready and Paper Out, and three push buttons to control On Line, Form Feed and Line Feed. A paper feed roller, Centronics port and an on/off button complete the surface features.

Under the dark tinted perspex cover, the carbon ribbon, print head, and tractor feeds can be seen.

Setting up

It is simple enough to load paper, and this can be single sheet, including up to triple carbons, or tractor feed. The tractor feed is adjustable to give any width between four and ten inches.

The carbon ribbon is easy to fit, and stays firmly in place. Once the plug is fitted, and the cable plugged into the Centronics port the printer is ready for use. This assumes that your computer or interface provides the necessary software. You should check whether operating software is available before buying.

For this review, a ZX Spectrum and the ZX Lprint interface were used successfully, and after only an hour, screen dumps were produced.

Documentation

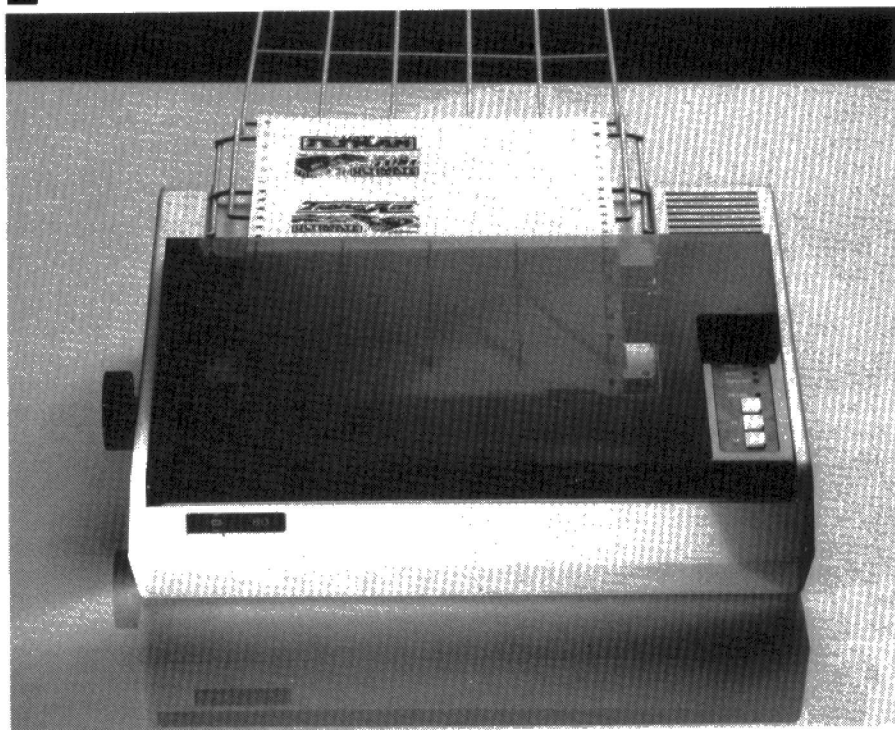
Although the printer is sold by Walters, which sounds English, the documentation seems to be the result of a bad translation, eg: 'Carefully lift front of printer unit and make it stands as the bottom of case be vartically face to you and hold the unit by the one of your hand on the soft surface'.

If you're familiar with hardware, you could make some sense of the 48-page booklet, but newcomers will probably be bemused and spend an inordinate amount of time altering the print format. Parts of the manual are well done, but certain chapters turn English inside out and programming examples use only a Basic interpreter and include no conversion hints.

Features

The WM80 boasts many features that have only been available up to now on much more expensive printers. There are 228 ASCII characters in the character set, and these have true descenders. The printer runs at 80cps, and facilities include both double-width and compressed print, and a combination of the two. Superscripts and

Less pricey printers



subscripts are printable, and seven international character sets can be selected using internal dip switches. Graphics dumps can also be obtained.

In use

The print quality is good, and the characters themselves are well formed, with the possible exception of the 'g' which is printed too high on the line for my liking. The graphics dumps are particularly good for a printer in this price range.

The speed advertised is slightly ambiguous, since it can print at 80cps, but it takes another second to feed a blank line through, bringing the average speed down to 40cps. This might, however, be of only minor concern in a printer of this price.

Opening the printer to change the dip switch settings is a simple task, as long as you follow the pictorial guide in the manual. In this section, the manual's words are particularly difficult to understand, but the pictures tell the story. The dip switches are easy to change, and can be moved with fingernail or screwdriver. The optional settings for these are clearly laid out in an appendix to the manual.

The printer appears to be quite sturdy, and has the feel of one much more expensive. It is relatively quiet, and works at about the same volume as an Epson, ie quieter than a same-price Seikosha.

One problem is occasional paper jams. To remove the jammed paper it is necessary to remove the carbon ribbon cartridge, and unscrew the metal guard running across the top of the carriage. Fortunately, paper doesn't seem to jam often.

Walters offers the standard 90-day guarantee, and also promises to do warranty work at the factory. A spokesman said that this work is normally done within 48 hours of receipt of a faulty machine.

Verdict

At this price, the printer seems almost unbeatable, even though closer inspection reveals some disadvantages in particular the quality of the manual. This lets down the whole product, and after five days of effort neither subscript nor italic printing had been coaxed out of it.

I'm sure it's possible, but the whole operation should take only minutes.

Although you may not want to do all your correspondence on it, the Walters is well worth considering for most general purpose uses.

Product Walters WM80 **Manufacturer** Walters Microsystems International Ltd, High Wycombe, (0494) 32751 **Price** £240.35 inc VAT and delivery **Interfaces** Centronics, RS232 optional **Outlets** Mail order or dealers.

PCN

micropaedia




Vol 15

Part 1

PULL OUT
AND KEEP

Looking at the

ELECTRON

- /// Acorn history 
- Keyword corner 
-  Inside the machine



Although it bears a passing similarity to Acorn's BBC Micro and Atom machines (see pictures at right), the Electron breaks new ground for Acorn with its size, the inclusion of Basic keywords on shifted keys and a price of £200.

A HISTORY OF ACORNS

Over the next three weeks, *PCN's* Micropaedia will take you into the Electron-ic age.

This week we'll take an overview of the hardware with a look at the history and development of the Electron (see elsewhere on this page), the inside of the machine with labels explaining where all the bits of the Electron are and exactly what each of them does, and the beginning of an alphabetically-ordered selection of keywords in the Electron's BBC Basic.

The second week features software for the machine, with a look first at Electron games (and conversion of BBC games to run on the Electron), then a discussion of business software and applications for the Electron — including spreadsheets and word-processing, and finally the second part of our look at a selection of Electron keywords.

The final week of the Electron Micropaedia will focus on peripherals (or add-ons) for the Electron. Although such peripherals are currently few and far between, we'll look at what is and will be available — including printer interfaces, attachments for ROM software and plug-ins for joysticks.

The history of the Acorn Electron resembles that of any youngest child.

Like any baby in a family of three, the Electron is expected to do much the same as its older siblings, the BBC Micro and the Acorn Atom. Its shortfalls (*ie* the lack of a Teletext mode and a lot of standard built-in expansion interfaces) are probably overshadowed by the enthusiasm accompanying any new birth.

The Electron's creation could, in fact, be likened to be the birth of an African elephant, as they appear to both have about the same gestation period. Acorn announced the Electron in the wake of Sinclair's 1982 launch of the ZX Spectrum colour computer, but the machine didn't emerge until Summer 1983.

It was well worth the wait. It has the benefit of much of the technology incorporated in Acorn's now-famous BBC Micro, but at less cost: no history of the Electron would be complete without a look at its BBC Micro heritage.

Acorn Computers was founded by Chris Curry and Herman Hauser in 1978 and didn't produce its first microcomputer until 1979 when they introduced the Acorn Atom. The Atom was a modest micro by modern standards with between 2 and 12K of RAM, a 6502-based processor and an idiosyncratic (but quick)

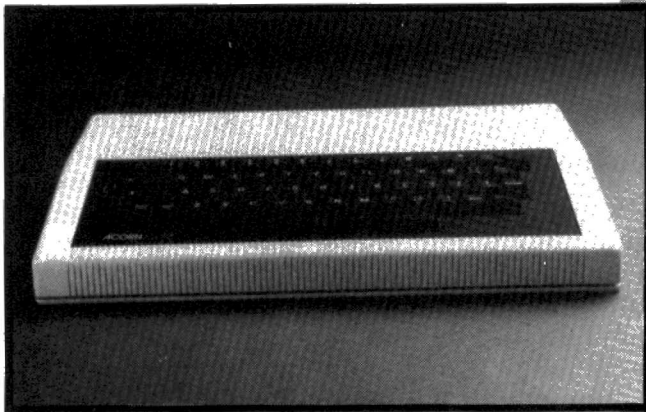
implementation of Basic.

The Atom did, however, sell for under £200, use a full-travel keyboard and promise the capability to run a low-cost local area networking facility called 'Econet'. Chris Curry's career in computers began in 1966 as a development engineer for Clive Sinclair's Radionics concern, for whom he designed the Executive Calculator in 1971. The calculator was small enough to run off a normal hearing aid and marked a breakthrough in size.

This tiny number-cruncher fitted in with the Sinclair style of product miniaturization. Curry stayed with Radionics till 1976 when he and Sinclair set up Science of Cambridge to sell component kits for computers and wristwatch calculators. The computer kit, dubbed the MK 14-Microprocessor Kit, had 14 chips and used a ZX81-type membrane keyboard, but it required the user to program entirely in machine code.

The kit uncovered a large number of would-be programmers wanting to know more about the machine than Curry had time to explain. He hired Cambridge University Ph.D student Herman Hauser to help cope. The result of Hauser's research into the needs of home computer users and Curry's own desire to develop a home computer around Basic was the Cambridge

The Atom (below) was introduced in 1980 and for £174 offered between 2 and 12K of RAM, ROM-based software and a printer interface on the expanded version.



Processor Unit — which later became Acorn, and shortly afterwards the Atom was born.

Acorn is an enterprising company, and was soon hard at work on a new prototype computer — the Proton. This was around the time the British Broadcasting Corporation was searching fairly desperately for a benchtest micro for its then-upcoming 'Making the Most of the Micro' TV show.

Curry and Hauser were quite sure their new machine could fit the bill and began making moves to turn it into the BBC Micro. The Proton was to have been a twin-processor replacement for the Atom, but the opportunity of the BBC contract and a feeling that the Proton had perhaps more commercial possibilities than Acorn had originally thought, led to the design of The Tube — an interface that would allow the second processor to be built as a stand-alone add-on. By February 1981, the BBC was sold on the Proton and they signed an agreement with Acorn.

In March, the BBC began circulating pictures of a prototype BBC machine along with its other literature about the Computer Literacy Project.

In December, the long-awaited BBC Micro was finally launched and received high praise from even the sterner critics.

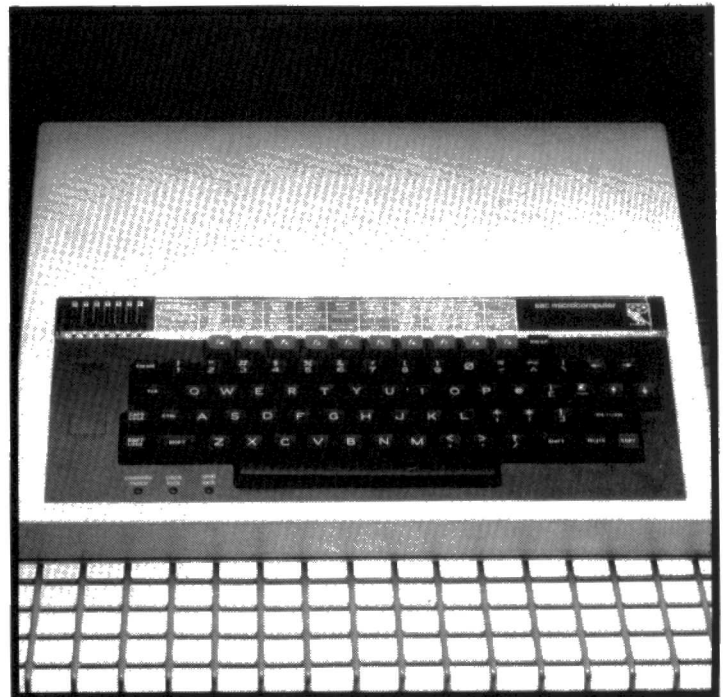
Some six months later, Clive Sinclair cracked the £200 barrier with his ZX Spectrum colour computer and Acorn, feeling truly challenged to bring in a new low-cost colour computer of their own, promptly announced the Electron was 'coming soon.'

'Soon' turned out to be about 18 months — which, by the standards of any other industry is a very quick product development time — but in the computer industry it is an aeon.

Once again, it was worth the wait. A small machine with 32K of RAM, good colour and sound and an ability to run most BBC Micro programs.

Others were soon echoing this sentiment as the Electron continued to receive rave after rave review — establishing it as one of the most popular under-£200 colour computers in the UK.

Max Phillips, reviewing the machine in *PCN* (Issue 25) said 'Acorn has an undoubted winner. The Electron isn't quite as simple as a half-priced BBC, but it does bring you amazing graphics and one of the fastest and most capable Basics in the business. It's easy to use and easy to learn.'



The BBC Micro (above) was introduced in early 1982 to a torrent of rave reviews. It has been widely taken up by schools and was the star of the BBC's Computer Programme.

Geof Wheelwright, writing in the same issue, said 'In short, the Electron has as much (if not more) in common with the phased out Atom as it does with the BBC... Some of the facilities now on offer for the Electron and BBC were first tried on the Electron... The prices of the two machines are similar, they use the same processors, have the same (type of) keyboards and offer much the same standard facilities.'

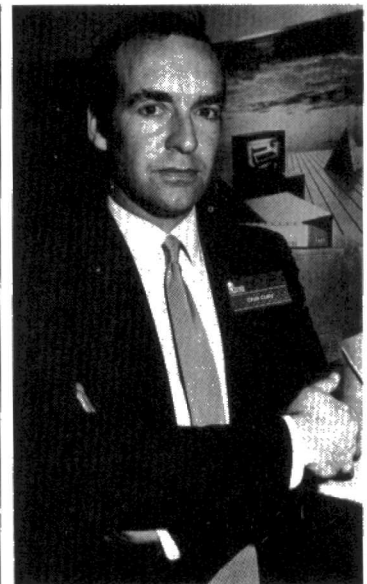
But like the Atom and BBC, the Electron will not realize its full potential until a good supply of software and peripherals is available. On the software side, the Electron is in pretty good shape as it can use much of the vast supply of BBC Micro software already on the market. (Its only great limitation is that it doesn't support the Mode 7 Teletext mode, but it shouldn't take much for software companies to modify Mode 7 — based programs for the Electron).

Peripherals are a slightly different story as Acorn has traditionally been slow to bring out add-ons for their own machines. The company has promised expansions for plug-in cartridge software, a printer interface, joystick interface, Teletext display adaptor and disk drives — but at the time of writing none of those add-ons were looming on the horizon.

The good news is that third-party peripheral development companies are racing to fill the 'Acorn gap' with their own Electron add-ons. The most popular extras seem to be printer and joystick interfaces and ROM boards that allow you to use BBC Micro ROM software.

The next two issues take an in-depth look at this machine with a discussion of applications for the Electron (and some of the software available) and a look at peripherals the next week.

In the rest of this week's issue, you'll find a detailed look inside the Electron in the centre pages and an examination of the Electron's BBC Basic in the last three pages.



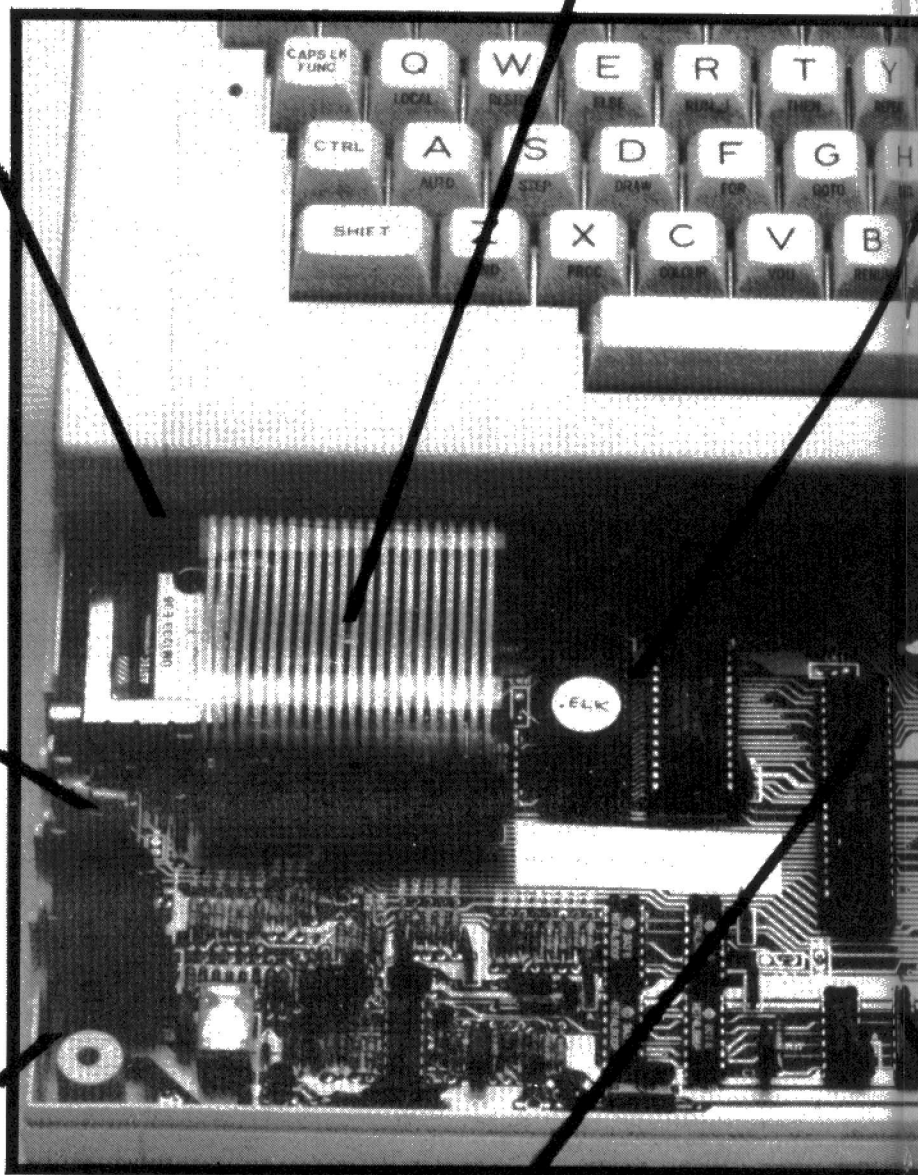
The photo above features Acorn's first release: co-managing director Chris Curry — who founded the company with Herman Hauser in the dark days when less than a million people had computers in their homes. The Electron isn't just a case of third-time lucky for Acorn — but third time lucky... Again.

Mr Curry is now making plans for Acorn's next machine — a business micro planned for later this year.

The UHF modulator — converts the Electron's video signal into something that can be understood by a television set. Just plug the machine into the UHF socket on the Electron at one end and into the aerial socket of your TV on the other end.

The speaker — The Electron speaker is positioned at the back of the machine, facing away from you. Unlike some computers — which have the speaker facing down and therefore muffling the sound — the Electron produces sound clearly and distinctly.

The Composite Video socket — allows you to plug the Electron directly into a professional video monitor. The signal output from this socket is in only black and white, but it can produce quite high resolution even in the 80-column mode when used with a good 'green screen' monitor.



The RGB video monitor socket gives you the opportunity of running the Electron with a professional high-resolution Red-Green-Blue monitor. Direct connection to an RGB monitor also eliminates the need to fiddle with tuning of colour and TV signals.

The 6502 processor — The heart of the Electron, this processor is the same as the one used on the BBC Micro, the Apple II computer and the Atari range of computers. The 6502, along with the Z-80, is the most popular of processors for home computers — so there should be no problem with people writing software for the machine.

The Machine Operating System and Basic chip — In early models of the Electron, the operating system and Basic language are on two different chips. In later models, however, Acorn has promised to put both functions on the same chip.

The edge connector — The Electron has bowed to current micro design conventions and included an 'edged connector' for expansion purposes at the back of the Electron. This edge connector will be the joining up-point for interfaces to run printers, disk drives, joysticks and other peripherals.

The power circuitry — To make it lighter than machines like the BBC — which use internal power supplies — the Electron uses an external power supply which transforms the mains 220 volts to 19 volts. The power is 'stepped down' again to 18 volts at the expansion port and +5, -5 and 0 volt lines to the Printed Circuit Board.

32K RAM — The Electron has the same memory size as its larger and more expensive sibling, the BBC Micro — but it uses far fewer chips to accomplish that task. Only four 64K bit RAM chips comprise the 32K.

The Uncommitted Logis Array — Probably the biggest custom chip you're likely to see in a home micro this year. This 64-pin chip does a lot of the legwork done by a combination of several chips on the BBC Micro. In addition to all the regular duties of the ULA, the Electron's custom chip has to handle all the different Modes in the Electron's display.

A DICTIONARY OF BBC BASIC

The Electron's BBC Basic programming language is largely made up of 'keywords' or instructions that ask the computer to carry out various tasks. Just looking at the first few keywords in the Electron's BBC Basic will give you an idea of what the machine is capable of. Below are some of those keywords and some explanations which show you how to get the most from them, and build on what you might already know.



ABS — Absolute value — This function ensures that a positive numeric value is always returned for a numeric variable. In simple

English, that means that if you're using an equation which might at some point return an unwanted negative value, you can always ensure the value is positive.

In the example below, the ABS function is used to turn the Electron into a small musical instrument.

```
5 Q=INKEY (32767)
20 X=Q-100
30 SOUND 1,-15,ABS(X),5
40 GOTO 5
```

In Line 5, the program sets a value that tells you how long the computer should wait for you to press a key before making sure it moves on to the next line.

In Line 20, the program defines a variable X in relation to the key you hit on the Electron (as defined by Q).

Line 30 is in charge of making the sound — with the ABS statement ensuring that the number representing the pitch is positive.

LINE 40 moves back to the beginning of the program to get a new note.



ADVAL — Analogue to Digital value — Although this command can do a

good deal more on the BBC Micro than the Electron because the Electron doesn't come standard with an Analogue to Digital converter, it's still worth knowing about.

The ADVAL command on the Electron is largely concerned with the amount of memory space in the buffers set aside for

SOUND functions. There are four SOUND channels on the Electron and they correspond to the four buffers on the Electron.

The sound buffers in ADVAL are numbered in the negative, starting at -5 for channel 0 and moving up to -8 for channel 3. The syntax is X=ADVAL (a number between -5 and -8 goes here).

Using this command in a program would look something like this:

```
5 Q=INKEY (32767)
20 X=Q-100
30 SOUND 1,-15,ABS(X),5
35 X=ADVAL (-6):PRINT X
40 GOTO 5
```

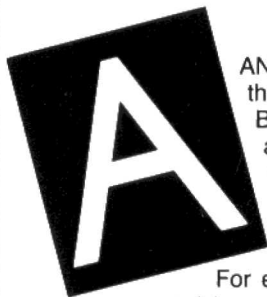
Note this looks almost identical to our first music demonstration program. By adding Line 35 to the program, you get something telling you how quickly the data (notes) are entered on the keyboard.

The faster you press the keys, the lower the number on the screen — data that's put in too quickly for the computer to handle goes into the buffer and the number



The keyword sequence **IF . . . AND . . . THEN** allows you to test for the simultaneous occurrence of two conditions. Using the keywords in a statement such as: **IF X=1 AND Y=10 THEN PRINT 'correct'** the program would print the word 'correct' if, and only if, the variable X holds a value of 1 and the variable Y holds a value of 10. If X=1 and y=7 the programme would proceed to the next instruction and ignore the words after **THEN**. Similarly, if X=3 and y=10 the program would also 'drop through' and print the ignore the **PRINT 'correct'** instruction. Only if both conditions are held to be true will the program proceed.

represented by **ADVAL** is the amount of room still left in that buffer.



AND — This is one of the most powerful Basic 'logical operators' that allows you to test whether or not certain conditions are true.

For example, perhaps you want to use a Randomizing function (more on **RND** later) to generate values for Colour in Mode 4, but realise there are only 16 'colours' available in that mode, and you have to make sure the value of the appropriate number is not less than 0 or greater than 16.

To make sure that condition is tested, you might use the **AND** statement like this: **40 IF C>0 AND C<16 THEN COLOUR C ELSE GOTO 40**

To put that to an even greater test, look at the following listing:

```
10 MODE 2:C=INT (RND(18))
20 S=INT(RND(255))
30 IF C>16 AND S< THEN GOTO 10
40 SOUND 1,-1,S,12
50 COLOUR C
60 IF C>10 THEN PRINT
   TAB(C-10,C);"COLOUR ";C:GOTO
80
70 PRINT TAB(C,C);"COLOUR ";C
80 FOR N=1 TO 1000;NEXT N:CLS:GO-
TO 10
```

In Lines 10 and 20 the program defines two variables that generate integer values; those variables are called C and S. The third line uses the **AND** statement to test that C (the variable for Colour) is less than 16, and that S (the variable for pitch in the **SOUND** statement) is less than 0.

Lines 40 and 50 actually carry out the job of making a sound and defining a colour.

In Lines 60 and 70, the program tests to make sure that the word "Colour" is going to be printed in the right place on screen and go about the business of printing it.

And finally, in Line 80, there's a delay **FOR . . . NEXT** loop to make sure that our image stays on-screen long enough to be

IF . . .

AND . . .

THEN . . .

seen before it loops back to the beginning of the program.



ASC — Gives the ASCII character value of a string. **ASC** stands for American Standard Code and the **II** denotes that it's the second version of the standard.

One use for this function is to get the Electron's keyboard to generate unique numeric values for each key. In the music example given in the discussion of **ABS**, you could easily have used the **ASC** function to generate music. Look at the program below:

```
5 INPUT A$:Q=ASC(A$)
20 X=Q-100
30 SOUND 1,-15,ABS(X),5
35 X=ADVAL(-6);PRINT X
40 GOTO 5
```

The program combines some of what you've learnt already about **ADVAL** with the music program example used to explain **ABS**. In this case, however, focus your attention on Line 5.

Here the **INPUT** function is used to set a

value for the string variable **A\$**, and then use good old **ASC** to figure out what the **ASCII** value of the **A\$** variable is.

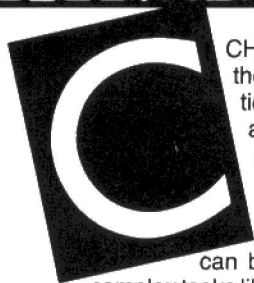
To set the value using **INPUT**, you have to hit the **RETURN** key once you've put in your character string or 'note'. Once you've done that, **ASC** will do the work of figuring out the **ASCII** value. When that value has been set, the numeric variable **Q** runs through and puts itself into the **SOUND** statement again.



AUTO — This is a simple programming aid. If you type **AUTO** at the beginning of every programming session, the command will automatically generate program line

numbers until you press **ESCAPE** key. The **AUTO** command automatically increases the line numbers by 10 after each **RETURN** starting at Line 10, unless you specify otherwise. For example, the statement:

AUTO 100, 8 will increase the line number by 8 each time you hit **RETURN**, and will start the program at Line 100.



CHR\$ — Performs the opposite function to ASC. It takes a number and generates the character string that represents that number. It

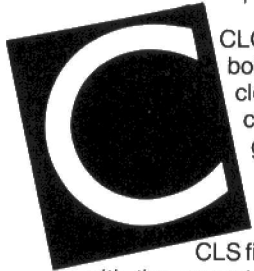
can be very helpful in complex tasks like sending control codes to printers, but since the Electron (at least at the time of writing) doesn't have a printer interface, this discussion will be confined to the command's more simple applications.

In the example program the CHR\$ command and a FOR...NEXT loop are used to print the Electron's full character set on-screen. (A character set is composed of the letters and symbols a computer is capable of spitting out).

```
10 FOR X=32 TO 126
20 PRINT CHR$(X);
30 NEXT X
40 PRINT CHR$(27)
```

Line 10 starts the FOR...NEXT loop by identifying that you are concerned with the value of X between 32 and 126. Line 20 uses CHR\$ to PRINT out the ASCII value of X.

Line 30 gets the next value for X, and Line 40 uses the known CHR\$ value of 27 as the carriage return character in order to bring the cursor back to the left-hand side of the screen once the program has run.



CLG and CLS — both these functions clear screens. CLG clears the graphics screen with current graphics background while

CLS fills the text screen with the current background colour. The example program below allows you to try both commands and see the difference between them for yourself. It draws a rectangle and then moves the rectangle across the screen, either by slowing drawing and undrawing the rectangle in new places on the screen (in the case of CLG) or by simply flashing the



rectangle on and off and advancing the position of the rectangle each time it moves.

To try the CLS function, simply exchange the CLG at Line 70 in the following listing for a CLS.

```
5 MODE 4
10 FOR X=1 TO 10
20 MOVE X*100,100
30 PLOT1,100,0
40 PLOT1,0,700
50 PLOT1,-100,0
60 PLOT1,0,-700
70 CLG
80 NEXT X
90 GOTO 5
```



COLOUR — One of the primary methods of getting colours up on the screen.

The listing seen below is a modified version of the one used to show how the CLEAR function

works. But to give you a better idea of what the Electron's range of colours are, the CLS statements are omitted at Lines 80 and 180.

```
5 MODE 2:FOR X= 1 TO 10
10 C=INT (RND(18))
20 S=INT (RND(255))
30 IF C>16 AND S<0 THEN GOTO 10
40 SOUND 1,-1,S,12
50 COLOUR C
60 IF C>10 THEN PRINT
TAB(C-10,C);"COLOUR ";C:GOTO 80
70 PRINT TAB(C,C);"COLOUR ";C
80 FOR N=1 TO 1000:NEXT N
90 NEXT X
100 CLEAR
105 FOR X= 1 TO 10
110 C=INT (RND(12))
120 S=INT (RND(235))
130 IF C>16 AND S<0 THEN GOTO 10
140 SOUND 1,-1,S,12
150 COLOUR C
160 IF C>10 THEN PRINT TAB
(C-10,C);"COLOUR ";C:GOTO 80
170 PRINT TAB(C,C);"COLOUR ";C
180 FOR N=1 TO 1000:NEXT N
190 NEXT X
```

A complete summary of what the available colours are in any screen mode is given on Page 141 of the User Guide — for both foreground and background colour (a background colour is always represented by a logical number exactly 128 more than its corresponding foreground colour).

Micropaedia Editor: Geof Wheelwright.

Design: Nigel Wingrove.

Credits: Some portions of this Micropaedia are extracted from a forthcoming PAN/PCN book on the Electron.

NEXT WEEK

A look at software for the Electron with a focus on word-processing, spreadsheets and graphics — as well as our continuing sample of Electron Basic keywords.

And in two week's time, we'll turn our attention to electron peripherals and finish up our look at keywords.

Colin Cohen taps out his copy for *PCN* faster than ever before, thanks to VuType.

Learn to type right

There are good programs and bad programs. The good programs can be further divided into good programs and good programs. I shall explain. Many of the good commercial (non-games) programs reviewed in these pages are perfectly competent and no doubt are well structured and use the computer's facilities to their full. However, if they had never been produced, computer owners would not be noticeably worse off. I know this all too well as I've had a BBC micro from the days when even the Welcome cassette seemed magic, and anything that came on the market was welcome.

In the rush to fill the gap there has been a deluge of software and much of it has been clever stuff. Even if the program was not especially useful there was no complaint as long as it did whatever it did adequately.

The computer manufacturers and conventional publishers have felt a desire to get in on the software act because others were — but they often lacked the inspiration needed when it came to the basic ideas.

If ever there was an exception to this rule it is Vu-Type from the BBC. It is a typing tutor produced in conjunction with Pitman Books — which should know all about it. Vu-Type seems an absolutely first class program — both in terms of content and implementation.

Documentation

Of course, in common with all the 'big name' software it is over-packaged, but it includes one of the best pieces of documentation I have yet seen. Its 50 A5 pages have to fulfil several different functions: instructions for LOADING and RUNNING the program, very full instructions for its use which are intended to be understood by users who know nothing of computers whose only interest is learning to type. Finally, there are eight pages devoted to typing principles.

If there are any criticisms of the documentation it is that the section on hand and body positioning should come earlier — an explanation of what touch typing is all about should probably come before the LOADING instructions.

There are remarkably few ambiguities and only one minor error that I found — the program is also largely self documenting. There is space in the manual for cataloguing the program and your results.

Setting up

The program loaded first time (side B is blank) and took its time as the intro is 1C blocks and the main program which it loads is another 3C blocks. This is followed by 23 Pitman exercises. Even the screen displays are reassuringly given in the documentation.

During the loading you are asked



whether you have motor control, a colour monitor and your operating system version. Part of the complexity of the program is that so much of it can be changed by the user. Almost anything can be redefined: you can alter all the colours in the display and even the graphics mode used, though the colours chosen are probably as good as any, but it's fun to experiment and worth choosing all the variables *before* you get stuck into the training.

You may find, if you choose four-colour graphics, that you will type ahead of the display. You can also decide which sound each key will make or whether to have them silent.

On the display the 'target' key is highlighted, but you can also choose to make the key you hit flash. This is particularly useful at the start as you are meant to look at the screen rather than the keyboard and this feature tells you straight away if you miss the target. Having the keys with sound was a help as my machine has had a bug on the space bar for as long as I can remember. The function keys are fully used — with different functions depending on the menu in use.

It was a little irritating that having chosen from a sub-menu you have to go back to the main menu before starting to type.

After loading, you are instructed to turn off the recorder (this is not an error, it's just that you are unlikely to need it for a long time). The subsequent display is divided into a map of the keyboard (you can delete the keytop lettering) over which there is a text window for the display of exercises.

These can be generated by the main program, or you can use the menu to load one of the Pitman exercises which vary from simple words to freestyle text. The 'copy' scrolls across the screen from left to right.

The exercises start with simple letter combinations — such as F and J which come directly under the first-finger home keys.

As you go on you can get reports on your progress, initially a percentage accuracy with a word of criticism or encouragement and, later on, full reports. This goes as far as recording the number of strikes on each key, and your performance on every key used.

The program distinguishes between caps and lower case — so you'll need to keep a careful watch on the caps/shift lock settings.

Verdict

In its initial stages I've found Vu-Type very easy to use. I once went on a course for several weeks and it simply didn't 'take'. As a journalist using the advanced search-and-peck technique with two fingers at 25 wpm, I can't wait to see if it will change my bad habits as much as I believe it will. The program costs £16.10 which must compare very favourably to any commercial course available.

Name Vu-Type **Application** Extended Typing Tutor **Price** £16.10 **Publisher** BBC Publications Ltd. (01-580 5577) **Language** Basic **Other versions** None **Format** Cassette **Outlets** Retail.

Ted Ball reviews an impressive assembler and machine code monitor for the 48K Spectrum.

Assembly pac

Devpac is an assembler and machine code monitor for the 48K Spectrum, providing extensive and powerful facilities to help you develop and debug machine code programs. Devpac includes many features intended to appeal to experienced programmers working on large programs but can also be used by beginners.

Features

Dvpac consists of two separate programs, the assembler/editor GENS3 and the machine code monitor MONS3. These can be loaded into any part of the memory and automatically relocate themselves to run at the loading address, making it easy to work with object code anywhere in the Spectrum's memory.

The assembler is very close to the Zilog standard, with standard opcode mnemonics, operand syntax, labels, and the directives ORG, EQU, DEFB, DEFW, DEFS, DEFM. Operands may include decimal, hex, binary and character constants; labels, "\$" to represent the location counter; expressions involving addition, subtraction, multiplication, division and modulus (remainder) and the logical operations AND, OR, XOR.

The main difference from standard syntax is the notation for binary and hex numbers: GENS3 requires you to precede binary and hex numbers with % and # instead of the Zilog form where the numbers must end with B or H.

There is also a large number of assembly options and commands, most of them concerned with specifying the format and amount of detail in assembly listings.

GENS3 includes two very powerful features — conditional assembly and the ability to assemble source code from tape as well as from memory — these make it particularly suitable for developing large programs. Being able to assemble from tape allows you to assemble very large programs without having to split them into sections that can be assembled separately and the two features together allow you to keep a file of commonly used subroutines on tape and incorporate the routines you need at assembly time instead of having to retype them whenever you write a new program.

The machine code monitor, MONS3, includes all the usual monitor features, allowing you to inspect and alter the computer's memory and the processor's registers, run machine code programs, set breakpoints, etc. There are two other noteworthy features: first is the disassembler, which includes the option of disassembling into a labelled text file that can be edited and reassembled by GENS3. The other is the single step function which allows you to run a machine code program

one instruction at a time, with full 'front panel' display, and works on programs in RAM and in ROM.

Presentation

The cassette contains two copies of GENS3 on one side and two copies of MONS3 on the other, but the labelling does not distinguish between the two sides.

The documentation consists of a 45 page booklet, with separate sections on GENS3 and MONS3. The features and the syntax for the assembler, editor and monitor commands are all explained clearly, although a beginner may have difficulty with the descriptions of some of the more advanced features. However, there are fully worked examples that you can follow through step by step and which help you understand how to use the package.

In use

Dvpac includes a great many features, so there are a lot of different types of commands. Most require a single key, or a shift key and another key to specify what is to be done, and some have to be followed by parameters. This kind of system is never easy to use when there are many non-mnemonic commands, and it is particularly difficult in Dvpac where there are three sections, the editor, the assembler, and the monitor, with similar commands used to do different things.

If you use Dvpac regularly you will eventually learn the commands you use most often, but you will inevitably have to do a lot of searching through the manual for the less common commands.

The assembler is reasonably fast when using a source code file in memory — with no listing it took about 4 seconds to assemble 150 lines. It is, of course, much slower when assembling from tape, but the loss of speed is a small price to pay for being able to assemble a source file that is much too big to fit in memory.

The MONS3 'front panel' displays a great deal of information; a disassembly of the instruction starting at the current

memory pointer; the contents of all the registers and, for each 16-bit register or register pair, the contents of the 7 bytes starting from the address pointed to by the register as well as the contents of 24 bytes centred on the memory pointer. Nevertheless, the display is clearly laid out and easy to interpret.

Debugging a program with the aid of breakpoints and the single step can be tedious, but the manual gives a great deal of help on how to go about it.

Reliability

The assembler performs extensive error checking and will find almost all errors in the source code. The only bug that I found in the error checking was that it will assemble the incorrect instruction "LD (HL), (HL)" and the corresponding forms with the index registers IX and IY. There also seems to be a bug involving the conditional assembly, where the object code is not displayed in the assembler listing. Conditional assembly does, however, generate the object code even though it is not displayed.

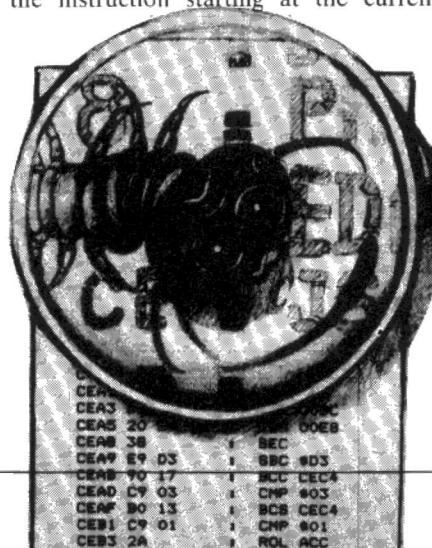
The monitor checks that commands are valid, and the manual gives many warnings about commands that could cause trouble or crash the machine. There is one case where I think that the warning in the manual should be replaced by additional error trapping in the program — when you single step, the program counter and the memory pointer must have the same value otherwise the consequences are unpredictable.

MONS3 and GENS3 are, however, quite reliable in normal use and should not give any trouble with reasonable care.

Verdict

The assembler is closer to the Zilog standard and includes more features than any of the numerous other assemblers available for the Spectrum. The monitor is also very good and includes many advanced features. Although Dvpac is not very easy to use — partly because there is so much in it — it is very powerful and this far outweighs the difficulties in using it, and the few minor bugs.

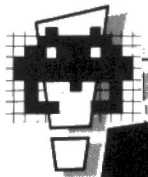
Dvpac is also very reasonably priced. Although it gives you much more the price is still about the same as other assembler/monitor packages for the Spectrum. Highly recommended.



RATING

Features	★★★★
Documentation	★★★★
Performance	★★★★
Usability	★★★
Reliability	★★★★
Overall value	★★★★

Name Dvpac **Application** Assembler & machine code monitor **System** 48K ZX Spectrum **Price** £14.00 **Publisher** Hisoft, 60 Hallam Moor, Liden, Swindon, Wilts, SN3 6LS **Format** Cassette **Language** Machine code **Outlets** Mail order.



DRAGON 32

Gateway getaways

Name Trace Race **System** Dragon 32, joysticks **Price** £8.75 **Publisher** Cable Software, 52 Limbury Road, Luton LU3 2PL **Format** Cassette **Language** Basic & M/code **Other versions** None **Outlets** Mail order.

Trace Race is a follow-up to Cable's other successes with games based on Walt Disney's Tron. It's another fast action game, mostly in machine code, with speech built into the program. Admittedly, I only came across one word, but it's still impressive.

Objectives

Two versions are open to you, either a solo game or a two-player option. Solo is you against the computer. You fly along a drawn grid, avoiding the trace gates the computer will put in your path.

Crashing into the grid walls, your own trace line (swift U-turns are out) or a gate ends your life. After your run is over, the time is displayed, allowing you to brush up on your skills before challenging friends and enemies to a duel.

The two player option has no trace gates, but the rules are the same.

The throttles on both bikes are jammed wide open (naturally) so your joystick only allows left/right and up/down movement.

Of the two bikes, red always appeared to go faster, so it's not the one to pick to stay alive.

In play

The program is in Cable's standard video box packaging, ie sturdy and smart. A short Basic program is loaded first, which on running loads the machine code.

The instruction sheet is clear, brief and simple. A nice touch at the start of the game is the choice of a fast or normal game. As a Dragon owner who suffered with a machine that crashed at the higher speed of 1.8 Hz, there was nothing more infuriating than having to find the POKE that doubles the speed, delete it then start a game. At least with this alternative you don't get an instant crash. Running at the normal speed still gives a fast game in either solo or duo versions.

The graphics are very good in both games, as is the sound. The noise made when the trace gates are drawn on didn't really fit in though. They made a kind of squelchy noise, which I didn't think was very suitable, it needed a more metallic sound.

This is only nitpicking though. If you want an enjoyable, straightforward, and instantly playable game for Christmas, then this is the one.

Verdict

By far the best of Cable's releases so far. But be warned, the only thing you can't do on bikes is stand still.

Jim Ballard

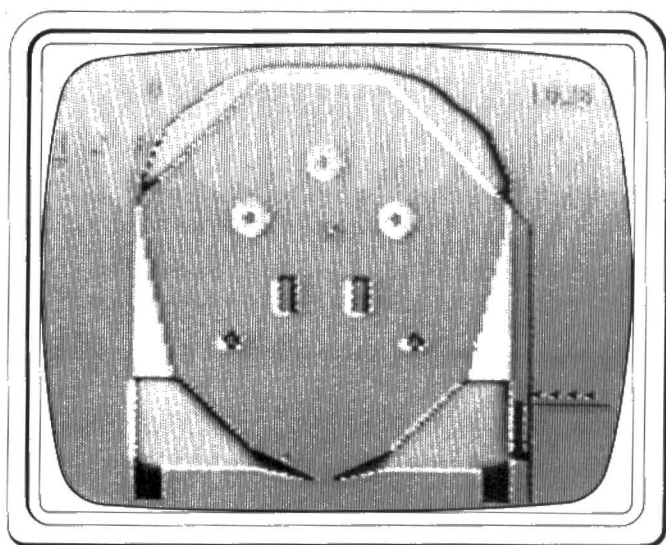
RATING

Lasting appeal

Playability

Use of machine

Value for money



Pins and needles

Name Pinball **System** Dragon 32 **Price** £8 **Publisher** Microdeal, 41 Truro Road, St Austell, Cornwall **Format** Cassette **Language** Machine code **Other versions** None **Outlets** Mail order, most retail.

It must be at least thirty years that pinball machines have been around and they're still going strong despite the Invaders invasion.

Objectives

The aim is to flip the ball around the table and score unbelievably high scores, which are recorded for you at top left of the screen, with current score at top right.

In play

There are three different table layouts to choose from, the first having seven bumpers and the second and third nine bumpers each. On each screen there is a whirling cross which appears from time to time and which will gain you 1000 points if you hit it. There's a choice of three background colours, and you can use either joystick or keyboard; this is not very strenuous as the '7' key is the only one you'll need. This chooses the table layout, fires the ball onto the table, and operates the flippers.

To fire the ball, of which you get five with a bonus every 10,000 points, you press the fire-button or '7' key down to pull the plunger back, then release it to fire. The ball bounces around with realistic sounds, and the speed of movement seems fairly authentic with it shooting off as it hits a

bumper or crawling slowly up the screen when gently flipped.

The problem with Pinball, though, is the graphics. These are decidedly fuzzy on even the clearest screen, and the green background I found almost unusable. As the ball bounces around, it also disappears briefly where the whirling cross appears and around the flippers. When this happens you can dig it out with a bout of frantic flipping.

Despite the dastardly disappearing ball, though, I did enjoy Pinball but felt guilty for doing so. It seemed that with complex adventures to be waded through, and multi-screened fast-moving arcade games to master, I ought not to be sitting there having fun with a game which only required you to lift one finger. But, as in the arcades, you become almost mesmerised by the bouncing ball, your flipper-finger itching, and all that matters is beating that high-score put up there by you or somebody else.

Verdict

At the standard Microdeal price of £8, this doesn't compare well with some of its other offerings, and its appeal may be limited to those occasional sessions when you realise you haven't played the game for a while, just as you can pass dozens of Pinball machines and ignore them then one day you simply have to play. So, although I enjoyed it, it might not be everyone's cup of tea.

Mike Gerrard

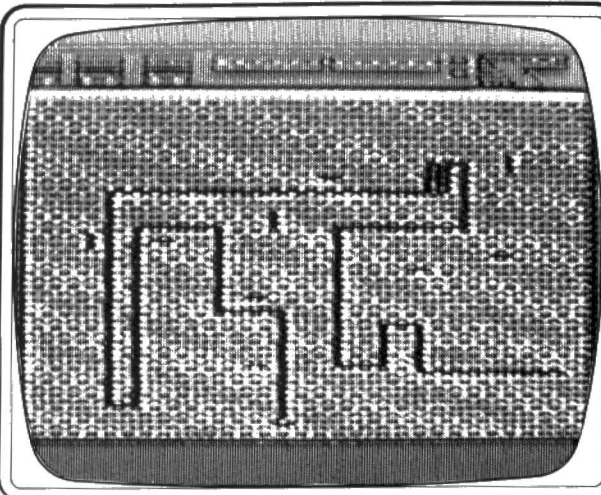
RATING

Lasting appeal

Playability

Use of machine

Overall value



John Fairbairn revels in the delights of games to cheer the half-starved Colour Genie owners.

Games of the Genie genus generally

Most people's reaction to the Colour Genie has been, 'Nice computer, shame about the software.' Only recently has the number of titles on offer topped 100, and some of those have been dreadful.

But despair not CG owners. At least one company has brought a touch of class to Genie software: JD Tronics of London.

The J is for Justin Barrington, the D for Daniel Brown, a duo who had many years' experience with the TRS-80. They are justifiably proud of their first offerings for the Genie — Micronopoly and Puckman.

Micronopoly

I was tickled pink when this easy-to-load program first ran. Unlike most computer Monopolies (for that is what it is of course) it is superbly designed — simple but elegant. Instead of the pure-text versions you mostly see this keeps the text on the right-hand side of the screen and shows the board moving down the left, like a slow-moving cine film — an effect reinforced by the sprocket-hole kind of sound as it moves. I loved it.

But I had one nasty shock. The cassette inlay gives no instructions on how to play but just says, 'All standard rules.' Rubbish!

It doesn't charge double rent when a person owns all the properties of a set, and I was even more disconcerted when the Genie (it plays against 1-4 humans) bought three houses for Piccadilly when it had only one on Coventry Street and none on Leicester Square.

This is definitely not sanctioned by my 1972 copy of the rules of Monopoly or by Maxine Brady's *The Monopoly Book*, but friends have assured me lots of people play this way to speed the game up. It's reasonable enough, but I would have preferred it as an option. However, as the program occupies a full 32K, YJD tell me nothing else could be squeezed in.

The Genie itself plays a good game, very aggressive and verging on the reckless, but fortune often favours the brave.

Although it is in Basic, the game is fast. It can seem slow but actually is faster than the real game — at least as played by my family where half the time is spent looking for the dice on the floor. The Genie handles the dice for you, and all the money, and you handle the Genie by a very simple menu system that offers a wide range of options (roll the dice, buy property or houses, mortgage, check list of properties, etc.)

There are a couple of bugs to do with user

input that don't seem to affect the actual game but cause a little irritation, and I would have liked longer delay loops in some cases. I would also like a 'who's got how much' option on the menu, and why



Passing go in Micronopoly.

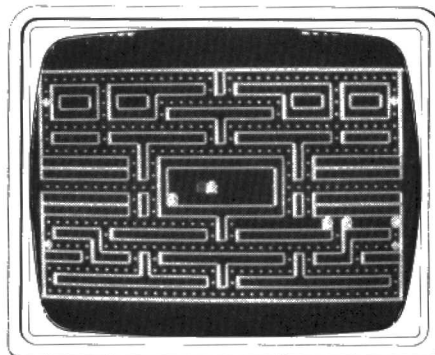
does Genie always go first?

Good family game, very good value for money if you accept the quirks.

Puckman

Yes, JD, it is another Pacman (they asked me not to say that), but this is the proper arcade version and another superb offering. It hardly needs describing except to confirm that it has the full maze, power pills and ghosts, and is smooth and fast (all machine code). Good sound, good graphics, easy loading, but no joystick control (use the arrow keys).

The title set me to musing about what ever happened to Puck matches, which shows my age and may explain why I'll never get the £100 prize for top score JD is



You'll need rapid reflexes for this one.

offering all purchasers. My kids, 6 and 12, won't win the prize either — I suspect you have to be around 14-15 to really get the best out of this game, the programmers' top score is 24,300 and the best by a purchaser so far is 13,200.

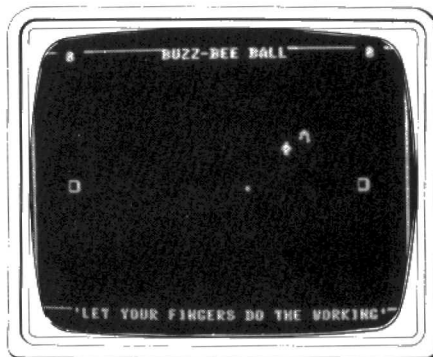
Incidentally, JD Tronics is set to issue a

cassette-based word processor in the New Year. I can't wait.

A. G. Kneesus Games

A rather different approach is taken by Ipswich's A.G. Kneesus, a very pseudonym but a very honest chap who is trying to offer reliable programs at a decent price, while at the same time making them all listable so that owners can re-work them or use them for study.

The programs are all in Basic and easy to load. Sound is usually very good, graphics are cute rather than brilliant (but easy for



Watch the birdie in Buzz-Bee-Ball.

the beginner to follow and change).

Best of the range seems to be *Video Paint Pot*. It grabbed my kids' attention, but the instructions are so awful they drifted away, frustrated, very quickly. I had to persevere, and eventually discovered the program will do a lot (draw solid or dotted lines in eight directions or circles in a variety of sizes and colours, and paint inside them) but I was still hazy about several things.

Ask for full instructions — get them and you'll get good value for money.

Draughts is another game I think many people could be satisfied with. Not the connoisseurs, that is, but it'll give most people a decent game.

Buzz-Bee-Ball was my favourite. It's football between a little bird (good on the wing) and a man. Using the arrow keys you can play against Genie or a partner. Utterly simple, but it fascinated simple me.

E. T. Aulie is a passable variety of Pacman, but if that's really what you want I'd go for JD Tronics' version any day.

Bust-a-Dam is an uninspired version of Breakout and *Retaliation*, which is a type of Space Invaders.

JD Tronics 42 Crediton Hill, London NW6 1HR.
Micronopoly £8.00 (needs 32K), Puckman £8.00.

A. G. Kneesus 97 Burrell Road, Ipswich IP28AD.
All titles £6.50.



SPECTRUM 48K

Undersea search

Name Hunter Killer **System** 48K Spectrum **Price** £7.95 **Publisher** Protek, 1a Young Square, Brucefield Industrial Estate, Livingston, West Lothian (0506-415353) **Format** Cassette **Language** Basic **Other versions** None **Outlets** Mail order, Menzies, other dealers

As the software skies are now so full of flight simulators that Protek has decided to come down from out of the clouds with a splash and offer something different, a submarine simulator.

Objectives

They have made you Commander of an "S" type submarine lurking off the coast of Holland and Germany during World War Two, your mission to locate and sink an enemy submarine in the same patch of water. Another nice, friendly game designed to increase international understanding.

First impressions

The cassette is certainly well presented, coming in a large box complete with 12-page manual and two additional instruction manuals because one of the interesting features of Hunter Killer is that it can be played in a dual game linking two machines with the networking lead provided with Interface 1, both machines needing an Interface with their own TV screens.

In play

The solo game offers five difficulty levels, and after choosing

your level you're given the option of seeing a practice torpedo fired. You're only likely to choose this option once as the torpedo makes painfully slow progress through the water towards the enemy sub seen through your periscope. To be fair, this is the only part of the game which was slow, the rest responding pretty briskly to the keyboard or a Protek joystick.

There are three screens giving you the information you need; the Control Room and Chart Room down below, both with excellent graphics.

The first tasks to master are how to dive and surface successfully, which involves adjusting your ballast tanks and hydroplanes. You cannot stay underwater too long as the electric motors can only be recharged from the diesel engines on the surface. But stay on the surface too long and you risk the enemy submarine getting you first, or being spotted by a passing aircraft (this doesn't apply in the dual game.)


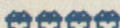


You scroll from the Control Room to the Chart Room using the 'C' and 'X' keys, and these keyboard controls are sensibly laid out, using adjacent keys where possible, with a summary of the controls printed on the back of the instruction booklet.

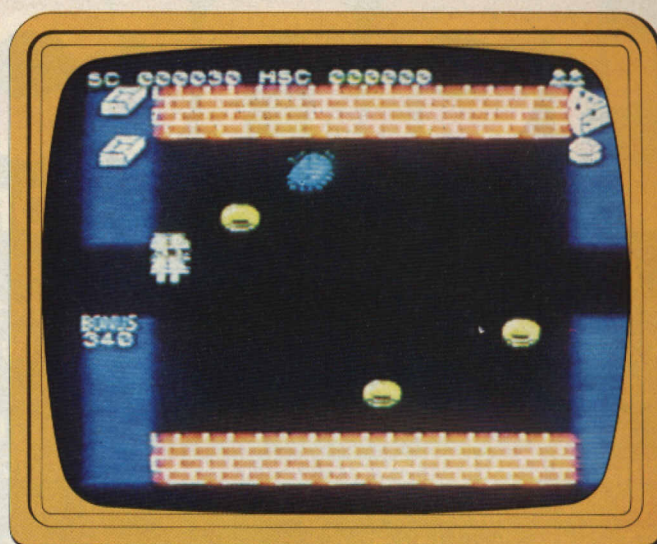
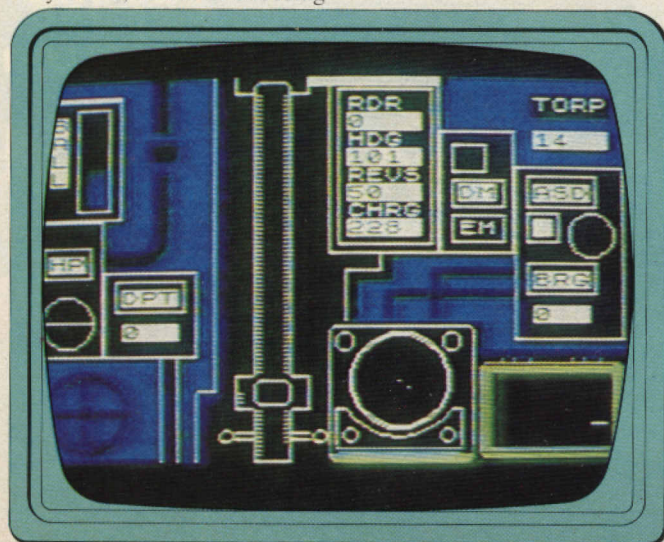
Verdict

An excellent simulation, and definitely not sub-standard.

Mike Gerrard

RATING

Lasting appeal 
Playability 
Use of machine 
Overall value 



A real bun fight

Name Mr Wimpy **System** Spectrum 48K **Price** £5.90 **Publisher** Ocean Software, Ralli Building, Stanley Street, Manchester M3 5FD **Format** Cassette **Language** Machine code **Other versions** None **Outlets** Sinclair dealers

In a novel marketing approach, Ocean Software has joined forces with the Wimpy fast food chain to bring us Mr Wimpy, a game of burger building and sausage survival.

Objectives

The game divides into two sections. Part 1 has Mr Wimpy collecting three ingredients while avoiding manhole covers, and Waldo the burger thief. Part two has him galloping up and down ladders and across platforms in an attempt to assemble four hamburgers. Trying to thwart him at different levels of the game are Sid Sos, Sam Spoon, Ogy Egg and Pam Pickle.

In play

Mr Wimpy resembles the Wimpy logo, a small chubby chap dressed in Beefeater costume. Starting with five lives, Mr Wimpy appears in a recess, stage left. As he moves out of his cubby hole, his little legs pump away, out pops a tray which then obligingly follows in his footsteps. Over at stage right are three burger ingredients which have to be brought back to the left-hand hidey-hole, one by one.

Floating up and down in the central portion of the screen are three golden doughnut-like manholes which Mr Wimpy

must dodge. A further hazard is the roly-poly blue meanie Waldo who charts a fast and erratic course around the screen. If he hits Mr Wimpy's tray, the tray (and the ingredient, if one is in tow) return to the starting grid.

Having successfully captured the ingredients, Mr Wimpy now faces a daunting screen where four hamburgers await his attention. The four constituents of each burger have been stacked vertically, one part per platform. Mr Wimpy has access to each of the platforms by means of ladders. When he runs over the top of one of the constituents, it becomes dislodged and falls down a level, with subsequent knock-on effects.

Quite simple, really, or it would be were it not for two beautifully animated mischief-makers: Sid Sos, a twitching frankfurter on legs, and Sam Spoon, a perambulating piece of cutlery. These relentlessly pursue Mr Wimpy who loses a life if caught. He can stop them temporarily by dropping a piece of burger on them or by shaking his pepperpot.





Later, a ferocious fried egg and a precocious pickle add to his problems.

Verdict

Excellent joystick/keyboard response, humorous graphics, smooth animation, and a zany plot — this one is a real giggle and for my money the best all-round family game to date.

Bob Chappell

RATING

Lasting Appeal 
Playability 
Use of Machine 
Overall Value 



COMMODORE 64

Rocks and lizards

Name Crazy Caveman **System** Commodore 64 **Price** £6.50 **Publisher** Merlin Software, Business and Technology Centre, Bessemer Drive, Stevenage, Herts. SG1 2DX **Format** Cassette **Language** Basic **Other versions** None **Outlets** Retail.

It's a refreshing change not having to blast away at mutants or invaders from some far-distant galaxy. The setting for this game is prehistoric times. You are a Neanderthal battling it out with an axe against dinosaurs, dodos and other early beasts.

Objectives

You are the Crazy Caveman of the title, armed only with an axe. You have become separated from your hunting party and you're trying to make it back home alone. In the process you come up against some prehistoric problems.

In play

Initially you encounter rolling rocks. These move across the screen from left to right and the only way to avoid them is to jump over the top of them. They usually come in groups of four with very little random variation in timing or separation and it soon becomes very easy to judge the jumping.

Not only do you have to hop, skip and jump over the rocks, but in order to progress to the next level you have to move the left to break new ground. Trying to dodge the issue by

moving to the right is of no use; you're limited to just a few steps.

Following the rocks comes a gang of dinosaurs. You have to be quick and accurate with your axe to kill them. Of course, if you don't you'll end up as their luncheon. They looked deceptively like herbivores to me.

If you manage to negotiate the dinosaurs, your next hazard is the dodos. Dodos, according to the instructions, never accomplished the art of flying. They only manage short hops and bounce around the screen in fairly large numbers.

It can get extremely difficult to avoid them. I never managed to kill one and I'm not even sure you're supposed to.

The fourth hazard is some different types of prehistoric birds (pterodactyls?) which fly above you dropping rocks on your head.

I'm afraid that my history books must be out of date as I could find no reference to rock-dropping birds.

Verdict

This was an enjoyable game which will test even the most ardent games player. The graphics are fairly well-done and the screen scrolling is exceptionally smooth. The sound, however, leaves a lot to be desired. If you are fed up with the usual space destructive games then you should give this one a second glance.

Nigel Farrier

RATING

Playability



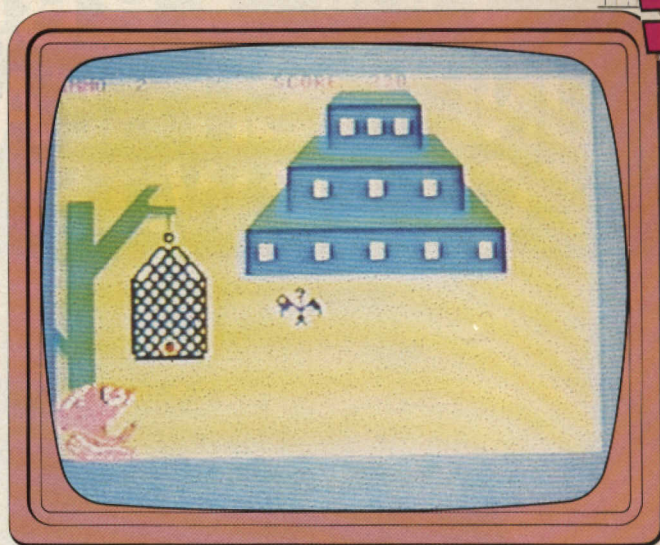
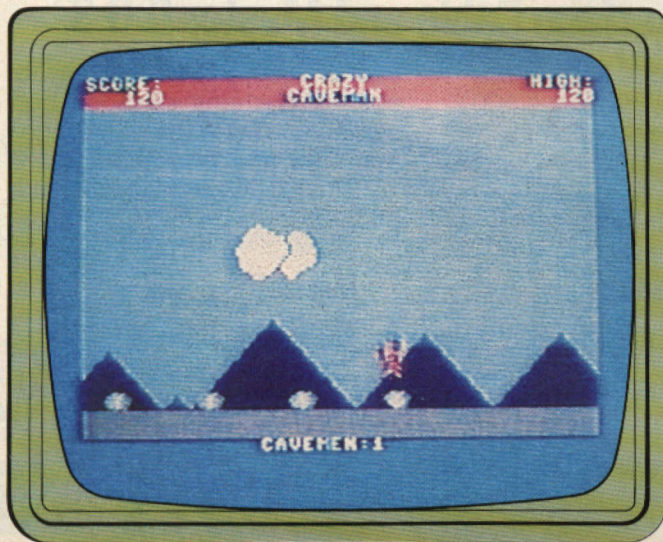
Use of machine



Value for money



Overall Value



Fire eater

Name Goodness Gracious **System** Commodore 64 **Price** £6.95 **Publisher** Beyond, Competition House, Farndon Road, Market Harborough, Leics **Format** Cassette **Language** Basic **Other Versions** None **Outlet** Mail order and most dealers.

Ever fancied controlling a dinosaur? Well now's your chance, as you travel back in time to a world ruled by dinosaurs. Being somewhat smarter than the average Tyrannosaurus Rex, these dinosaurs hurl fireballs from their mouths, and keep all the other nasties at bay.

Objectives

These prehistoric beasts get their power from a magical red gem, which everything else in this strange world is trying to get hold of.

You control the dinosaur, and make it spit fireballs at appropriate moments to eliminate every other life-form that appears on the screen. Should the magical gem come under attack three times in the same location, it is moved off to a new hiding place and must defend it all over again.

Initially you have to spit fireballs at a devil-like figure that approaches from the right — subsequent devils come at you at slightly faster speeds. The next level has you at the top left of a flight of stairs, another leads up from the middle of the screen to the right. Down this hop aliens at which you have to spit.

There's a little competition being run in conjunction with this game. If you manage to

survive five attacks from little monsters bent on taking the gem and running, you can write in to the Beyond team and tell them how the attacks begin on level 6.

In play

You might be forgiven for concluding this is a good, unusual game.

Unusual it may be, but good it certainly isn't.

I doubt whether many will enter the competition, because this game becomes so tedious.

Your dinosaur cannot move about the screen nimbly dodging other creatures and spitting at them as it's rooted to the spot. Instead, your solitary control key in the whole game is the space bar. This must be pressed down for an interval of time, and on release the fireball wobbles its way across the screen; the distance travelled is related to length of time the key was held down.

The supply of fireballs is limited to 10 per game, with a bonus level of 1 fireball for every alien successfully demolished.

Of course, you could always go for expert level, and start off with 5 and get 2 extra for every hit.

Verdict

Not destined to become one of the all time greats in the 64 Hall of Fame, and for a new company trying to make its way in the computer software scene this is a very disappointing start.

Pete Gerrard

RATING

Lasting appeal



Playability



Use of machine



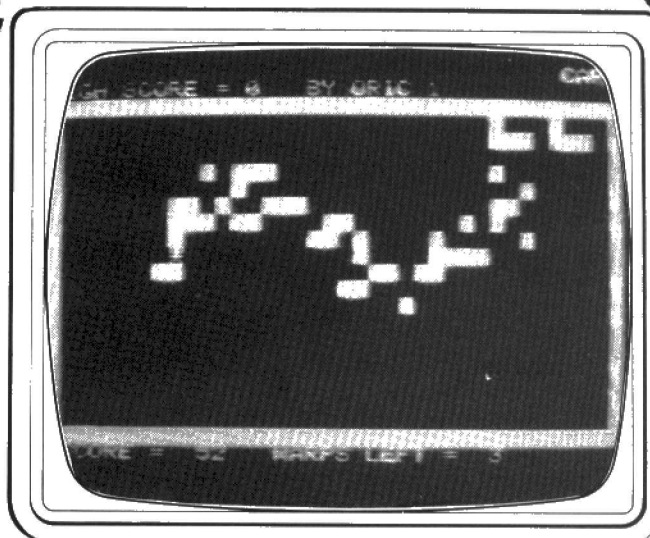
Value for money



Jungle chase

ORIC-1

PCN PROGRAMS



We pay for published programs on a sliding scale which take into account length, complexity, originality and the programming skill demonstrated in the program. So why not give us a RUN for our money?

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Kenn Garroch, Personal Computer News, 62 Oxford St, London W1A 2HG.

Title *Jungle Chase*
Machine *Oric 1 48K*
Application *Game*
Language *Tansoft Basic*
Author *R de Mercado*

Have you ever fancied yourself as a jungle explorer? If you have then here's a game for you.

Having stumbled across a man-eating plant whilst exploring the deepest jungles of darkest Africa, you have to try to escape. You must avoid

the flesh-eating plant as much as you can and not become surrounded by it. You do not, unfortunately, have any weapons, so you cannot attack the plant. However, you do have the ability to warp away from your current position three times to a new, random one.

<p>2 Set screen colours, red ink on black paper.</p> <p>3 Initialise the high score of zero to "ORIC 1".</p> <p>4 Gosub and define the plant character and the explorer zero.</p> <p>7-8 Set up a random x/y position for the explorer.</p> <p>9 Set up the score and warps.</p> <p>21 Gosub and give the instructions.</p> <p>25 Clear the screen and set the ink and paper colours.</p> <p>30-35 Print the surrounding jungle.</p> <p>50 Plot the explorer onto the screen.</p> <p>110 Remember the position of the explorer.</p> <p>115-116 Print up the number of warps and the current score.</p> <p>117-118 Print up the high score and who.</p> <p>120 Select a random number to specify the next position of the plant.</p> <p>121-124 Jump to the appropriate routine to check the place where the plant is going to be.</p> <p>125 Make sure G is in the range 1-4.</p> <p>127-145 Check the positions top, bottom, right, left to see what character is there.</p> <p>150 Put the plant onto the screen.</p> <p>155 If bell is on then ping.</p> <p>160 Save position of explorer.</p> <p>165 If there are some warps left then skip the next bit.</p> <p>170 Check for surround.</p> <p>200 Get a key from the keyboard.</p> <p>210 If space bar and there are warps left, then warp.</p> <p>220 Bell on if "B".</p>	<pre> 0 REM COPYRIGHT R. de Mercado 1 REM JUNGLE CHASE 2 PRINTCHR\$(6):PRINTCHR\$(17) 3 HS=0:HS\$="ORIC 1" 4 GOSUB 1000 7 X=INT(RND(1)*36)+1:IF X<2 THEN GOTO 7 8 Y=INT(RND(1)*19)+1:IF Y<2 THEN GOTO 8 9 S=1:W=3 21 GOSUB 2000 25 CLS:PAPER0:INK2 30 FOR I=1 TO 37:PLOT I,1,"!":PLOT I,21,"!":NEXT I 35 FOR I=1 TO 21:PLOT 1,I,"!":PLOT 36,I,"!":NEXT I 50 PLOT X,Y,CHR\$(35) 100 REM PLAY 110 A=X:B=Y 115 PLOT 2,22,"SCORE = ":PLOT 10,22,STR\$(S):PLOT 16,22,"WARPS LEFT = " 116 PLOT 29,22,STR\$(W) 117 PLOT 1,0,"HIGH SCORE = ":PLOT 13,0,STR\$(HS):PLOT 18,0,"BY " 118 PLOT 21,0,HS\$ 120 LET G=INT(RND(1)*4)+1 121 IF G=1 THEN GOTO 127 122 IF G=2 THEN GOTO 133 123 IF G=3 THEN GOTO 137 124 IF G=4 THEN GOTO 143 125 GOTO 120 127 IF SCRN(A+1,B)=35 OR SCRN(A+1,B)=33 THEN 120 130 IF A<37 AND A>2 THEN A=A+1 132 GOTO 150 133 IF SCRN(A-1,B)=35 OR SCRN(A-1,B)=33 THEN 120 135 IF A<37 AND A>2 THEN A=A-1 136 GOTO 150 137 IF SCRN(A,B+1)=35 OR SCRN(A,B+1)=33 THEN 120 140 IF B<20 AND B>2 THEN B=B+1 142 GOTO 150 143 IF SCRN(A,B-1)=35 OR SCRN(A,B-1)=33 THEN 120 145 IF B<20 AND B>2 THEN B=B-1 150 PLOT A,B,CHR\$(33) 155 IF C=1 THEN PING 160 M=X:N=Y 165 IF W>0 THEN GOTO 200 170 IF SCRN(M,N-1)=33 AND SCRN(M,N+1)=33 AND SCRN(M+1,N)=33 AND SCRN(M-1,N)=33 THEN 400 200 K\$=KEY\$ 210 IF K\$=CHR\$(32) AND W>0 THEN GOTO 3000 220 IF K\$=CHR\$(66) THEN C=1 225 IF K\$=CHR\$(79) THEN C=0 230 IF K\$=CHR\$(11) AND SCRN(X,Y-1)=33 THEN 200 235 IF K\$=CHR\$(11) AND SCRN(X,Y-1)=32 THEN Y=Y-1 236 IF K\$=CHR\$(11) THEN 270 240 IF K\$=CHR\$(10) AND SCRN(X,Y+1)=33 THEN 200 245 IF K\$=CHR\$(10) AND SCRN(X,Y+1)=32 THEN Y=Y+1 246 IF K\$=CHR\$(10) THEN 270 250 IF K\$=CHR\$(8) AND SCRN(X-1,Y)=33 THEN 200 255 IF K\$=CHR\$(8) AND SCRN(X-1,Y)=32 THEN X=X-1 256 IF K\$=CHR\$(8) THEN 270 260 IF K\$=CHR\$(9) AND SCRN(X+1,Y)=33 THEN 200 265 IF K\$=CHR\$(9) AND SCRN(X+1,Y)=32 THEN X=X+1 266 IF K\$=CHR\$(9) THEN 270 267 FOR K=B TO 11:IF K\$<>CHR\$(K) THEN 200:NEXT K 270 A=X:B=Y 290 PLOT M,N,CHR\$(32) 300 PLOT X,Y,CHR\$(35) 310 S=S+1 320 GOTO 110 400 PLOT 2,24,"I'M AFRAID YOU'RE SURROUNDED PAL" 405 T\$=STR\$(S) 410 WAIT 200 </pre>
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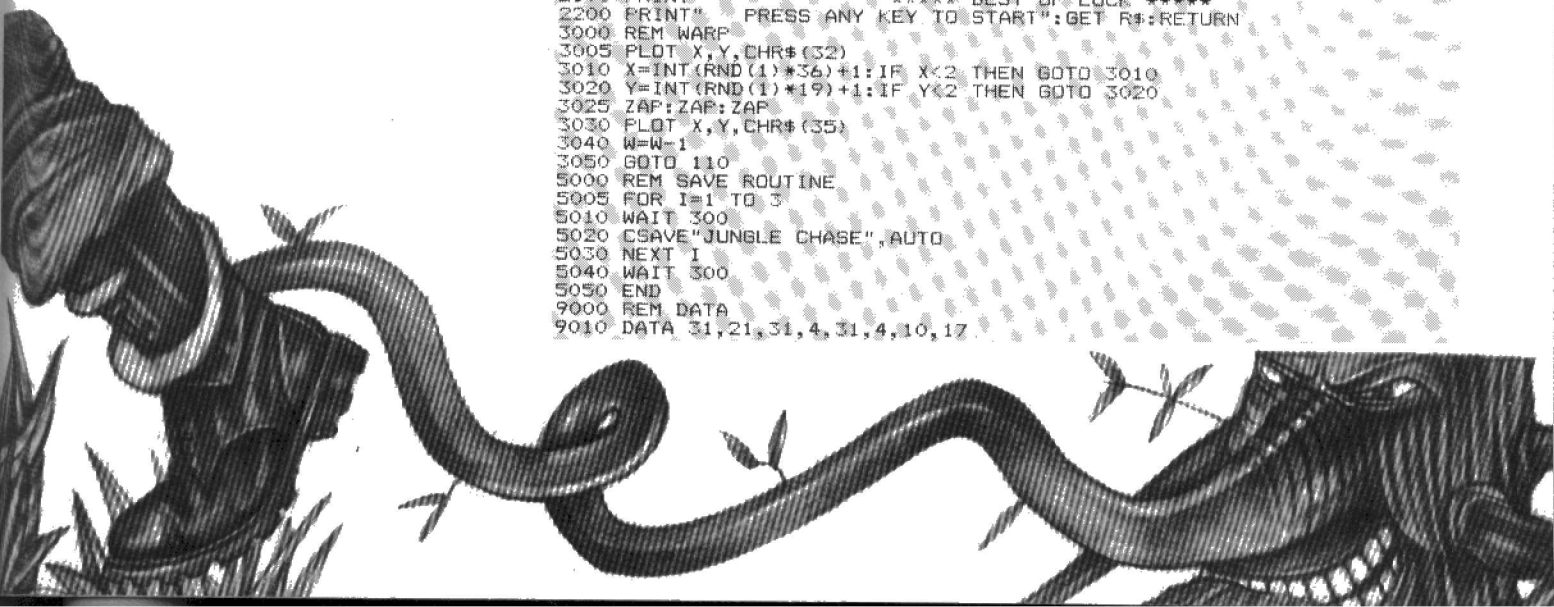
JUNGLE CHASE

► 65 225 Bell off if "O".
 230-236 Check for upward movement, depending on plant position.
 240-246 Downward movement (cursor down key pressed).
 250-256 Left.
 260-266 Right.
 270 Save position of the explorer.
 290-300 Update the explorer.
 310 Update the score.
 320 Continue the game.
 400 You are surrounded.
 405 Put the score into a string.
 410 Pause.
 414-418 Print a message depending on the score.
 420-440 Print the score.
 444 Check whether the high score has been beaten.
 450-490 Prompt for another game and act on the answer.
 505 Wait a bit.
 535 Set up the new high score.
 537-550 Print up the new high score.
 555-560 Print JUNGLE CHASE in double height characters.
 565-580 Get the new hi-scorer's name.
 1000-1999 Define the user defined characters for the plant and the explorer.
 2000-2200 Instructions.
 3000 Begin the warp routine.
 3005 Remove explorer from the current position.
 3010-3020 Select a new random position for the explorer to warp to.
 3025 Make the warp sound.
 3030 Replace the explorer.
 3040 Decrement the number of warps.
 3050 Continue the game.
 5000-5050 Save the game three times.
 9010 Data for the explorer character.

```

414 IF S<10 THEN PLOT 2,24,"HUH,SOME EXPLORER YOU WERE .....".
415 IF S>10 AND S<30 THEN PLOT 2,24,"YOU WEREN'T MADE FOR JUNGLE LIFE..".
416 IF S>30 AND S<50 THEN PLOT 2,24,"I THINK YOU NEED MORE EXPERIENCE..".
417 IF S>50 AND S<100 THEN PLOT 2,24,"HARD LINES,BETTER LUCK NEXT TIME..".
418 IF S>100 THEN PLOT 2,24,"EAT YOUR HEART OUT DAVID BELLAMY..".
420 PLOT 2,24,"NEVER MIND, YOU SCORED..".
430 PLOT 24,26,"*".
440 PLOT 29,28,"POINTS".
444 IF S>HS THEN GOSUB 500
450 PLOT 11,14,"ANOTHER GAME Y'N?"
460 GET D$
475 IF D$="Y" THEN GOTO 7
480 IF D$="N" THEN CLS:INK 9:PAPER 7
485 IF D$>"N" THEN 460
490 END
500 REM HI-SCORE
505 WAIT 210
535 HS=S
537 PLOT 14,2,STR$(HS)
538 PRINTCHR$(6):PRINTCHR$(17)
540 CLS:PRINT:PRINT
550 V$=" JUNGLE CHASE HI-SCORE":PRINT
555 PRINT CHR$(133)CHR$(142):V$
560 PRINT CHR$(133)CHR$(142):V$
565 PRINT:PRINT:PRINT:PLEASE TYPE IN YOUR NAME UP TO 17 CHARACTERS
570 PRINT:LETTERS LONG THEN RETURN:PRINT:PRINT:INPUT H$
575 IF LEN(H$)>15 THEN GOTO 540
580 PRINTCHR$(4):PRINTCHR$(17)
590 RETURN
597 GOTO 110
598 GET A$
599 END
1000 REM
1005 RESTORE
1010 FOR I=46344 TO 46351:PRINT "*****";NEXT I
1020 FOR I=46351 TO 46357
1030 PRINT "*****";NEXT I
1999 RETURN
2000 REM INSTRUCTIONS
2010 CLS:INK INT(RND(1)*7)+1:PAPER 0
2020 F$=" JUNGLE CHASE":PRINT
2030 PRINTCHR$(132)CHR$(138):F$
2032 PRINTCHR$(132)CHR$(138):F$
2040 PRINT
2050 PRINT" YOU ARE AN EXPLORER AND YOU ARE":PRINT
2052 PRINT" IN THE DEEPEST AFRICAN JUNGLE WHEN":PRINT
2054 PRINT" YOU STUMBLE ACROSS A FAST GROWING..":PRINT
2056 PRINT" MAN EATING PLANT..":PRINT
2058 PRINT" THE PLANT GIVES CHASE AND YOU MUST":PRINT
2060 PRINT" KEEP MOVING AWAY FROM IT..":PRINT
2062 PRINT"THE GAME ENDS WHEN YOU ARE SURROUNDED":PRINT
2064 PRINT"YOU TAKE IT IN TURNS TO MOVE AND":PRINT
2066 PRINT"TO MOVE YOU USE THE RELEVANT":PRINT
2067 PRINT"CURSOR KEYS":PRINT
2068 PRINT" YOU SCORE 1 POINT FOR EACH MOVE"
2070 PRINT"PRESS ANY KEY TO CONTINUE":GET R$
2080 CLS:F$=" JUNGLE CHASE":PRINT
2090 PRINTCHR$(132)CHR$(138):F$
2100 PRINTCHR$(132)CHR$(138):F$
2110 INK INT(RND(1)*7)+1:PRINT
2120 PRINT"YOU DO, HOWEVER HAVE ONE 'WEAPON'":PRINT
2130 PRINT"YOU HAVE THREE WARPS..":PRINT
2140 PRINT"IF YOU DO GET SURROUNDED THEN PRESS":PRINT
2150 PRINT"THE SPACE BAR AND YOU WILL DISAPPEAR":PRINT
2160 PRINT"AND REAPPEAR AT A RANDOM POSITION ON":PRINT
2170 PRINT"THE SCREEN,ONCE YOUR STOCK OF WARPS":PRINT
2180 PRINT"HAS RUN OUT THEN YOU START WORRYING..":PRINT
2185 PRINT"IF YOU WANT A BELL WHEN IT IS YOUR":PRINT
2186 PRINT"TURN PRESS 'B' AND IF YOU WANT TO":PRINT
2187 PRINT"TURN IT OFF PRESS 'O'":PRINT
2190 PRINT" ***** BEST OF LUCK *****"
2200 PRINT" PRESS ANY KEY TO START":GET R$:RETURN
3000 REM WARP
3005 PLOT X,Y,CHR$(32)
3010 X=INT(RND(1)*36)+1:IF X<2 THEN GOTO 3010
3020 Y=INT(RND(1)*19)+1:IF Y<2 THEN GOTO 3020
3025 ZAP:ZAP:ZAP
3030 PLOT X,Y,CHR$(35)
3040 W=W-1
3050 GOTO 110
5000 REM SAVE ROUTINE
5005 FOR I=1 TO 3
5010 WAIT 300
5020 CSAVE"JUNGLE CHASE",AUTO
5030 NEXT I
5040 WAIT 300
5050 END
9000 REM DATA
9010 DATA 31,21,31,4,31,4,10,17

```



Screen dump

Title *Screen Dump*
Machine *BBC B*
Application *Printing*
Language *6502 Machine Code Assembler*
Author *J M Buckley*

If you have a Centronics 739 printer and a BBC micro computer, then this could be the program for you. This screen dump routine, from J M Buckley of St Albans, takes about four minutes to dump the whole screen because it is written in Assembler. This compares well with an equivalent Basic program, which, the author reckons, will take around 15 to 20 minutes.

The program produces a two tone

Graphics Dump. Odd logical colours are printed as solid black, colours with bit one set but not bit zero are printed with alternate dots to give a grey colour. This may be changed in lines 520 to 550 and 650 to 730 of the program. The utility uses PAGE & 11 of the BBC's memory. This is unused except when Data or *SPOOL files are open and allows PAGE to be set as low as &1200 for large programs.

The Screen dump routine itself was designed to work in MODE 0 but will work equally well in all graphics modes. For the lower resolution modes it could be modified to give a more complex range of tones if necessary.

Make sure that the graphics origin has been set to the bottom left hand corner before calling the program (*PRTSCRN with a disk system) by using VDU 29,0,0;.

100 Assemble the code for the screen dump.
110 Switch on the extended messages for the filing system.
120 Save the assembled code under the file name \$.PRTSCRN. Note that if data files are being used then the base location &1100 will need to be changed i.e. the code will need to be placed elsewhere in the memory.
130 Reset the filing system messages.
140 End the program.
170 Start the assembling procedure.
180-200 Set up the various variables. Block is used for work space.
210 The code needs to be assembled twice. The first time assembles and takes note of the forward jump addresses. The second pass assigns the addresses to their correct values giving the final code.
220 P% is the origin that the code is assembled to.
240 On the first pass OPO is set to 0 so no assembly errors are generated. The second pass generates an assembly listing.
260-350 Switch on the printer, set printer to graphics mode with the appropriate escape sequence.
370-430 Set up the parameter block for the OSWORD call.
450-490 Re-initialise the zero page locations for each pair of bytes.

```
10REM Centronics Printer machine code
20REM Graphics Dump
30REM J.M.Buckley 3/12/83
40REM Copyright reserved, Unrestricted non-Commercial use encouraged.
50REM 2-tone version 2.0
60REM uses zero Page &70 -> &77 for parameter block
70REM uses Page &11 for Program, O.K. if no data files. Change lines
80REM 120 and 220 if required.
90
100PROCassemble
110*OPT1,2
120*SAVE $.PRTSCRN 1100 11C6 1100
130*OPT1,0
140END
150
160
170DEFPROCassemble
180block=&70
190oswrch=&FFEE
200osword=&FFF1
210FOR pass=0 TO 3 STEP 3
220P%=&1100
230I
240OPT pass
250.dump_screen
260 LDA E2 \ Enable printer
270 JSR oswrch
280 LDA E13 \ start printer at new line
290 JSR wrch_to_printer
300 LDA E27 \ Switch printer to graphics
310 JSR wrch_to_printer \ mode with sequence
320 LDA E37 \ ESC,Z,0
330 JSR wrch_to_printer
340 LDA E48
350 JSR wrch_to_printer
360
370 LDA E10 \ set up parameter block for OSWORD
380 STA block \ LSB of X
390 LDA E0
400 STA block +1 \ MSB of X
410 STA block +2 \ LSB of Y
420 STA block +3 \ MSB of Y
430
440.loop1
450 LDA E0
460 STA block +5 \ space to build printer bytes
470 STA block +6
480 LDA E5
490 STA block +7 \ bit counter while building bytes
500.loop2
510 LDX E block MOD 256 \ Set up registers for OSWORD Call
520 LDY E block DIV 256
530 LDA E9
540 JSR osword
550 LSR block +4 \ result bit 0 into Carry
560 ROL block +5 \ rotate back into printer byte 1 LSB
570 LSR block +4 \ result bit 1 into Carry
580 ROL block +6 \ rotate back into printer byte 2 LSB
590 SEC
600 LDA block \ reduce X by 2 for each bit
610 SBC E2
```

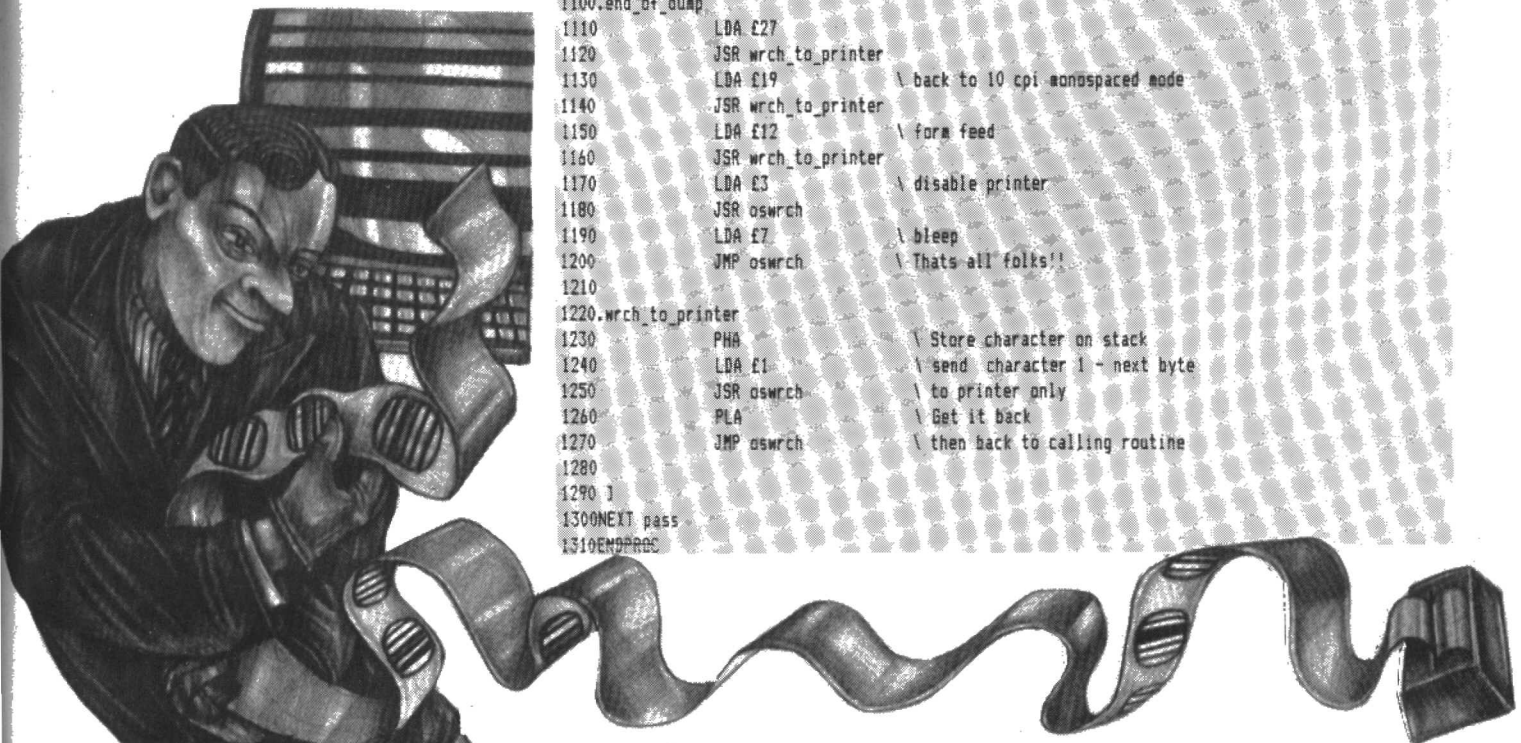

SCREEN DUMP

- 68 510-670 Perform OSWORD call, transfer bit 0 of the result to byte 1, bit 2 to byte 2, shifting bytes left (equivalent to multiplying by two), decrement the X pointer in zero page, by two. Do this for six bytes.
- 680-760 You now have two numbers between 0 and 63. The printer requires them between 32 and 95 so add 32. OR the second byte with the first to give solid black for odd colours.
- 790-930 Increase the Y pointer by four. If Y is now 1024 you have reached the end of the line, otherwise restore X to what it was at the beginning of this pair of bytes by adding 12.
- 950-1090 Send a return to the printer and zero Y. Add 24 to X (12+12 for a new line) If X is greater than 1279 then the dump is finished.
- 110-1200 You have finished, so restore the printer to normal operation, send a form feed, switch it off, BLEEP.
- 1230-1270 Subroutine to precede character by 1, ensuring it is sent only to the printer. Works on all OS types.

```

620 STA block
630 LDA block +1
640 SBC £0
650 STA block +1
660 DEC block +7 \ 6 pixels for each byte
670 BPL loop2
680 LDA block +5
690 CLC
700 ADC £32 \ bring to correct range for 739
710 JSR wrch_to_printer
720 LDA block +5 \ second byte
730 ORA block +5 \ Or with byte 1 ( odd colours solid )
740 CLC
750 ADC £32 \ bring to 739 range
760 JSR wrch_to_printer
770 LDA block +2
780 CLC
790 ADC £4 \ increase Y by 4
774 2 STA block +2
810 LDA block +3
820 ADC £0
830 STA block +3
840 CMP £4
850 BEQ newline \ Y has reached max value so end of line
860 LDA block
870 CLC
880 ADC £12 \ Restore Value of X for new Byte
890 STA block
900 LDA block +1
910 ADC £0
920 STA block +1
930 JMP loop1 \ go back for next byte
940 newline
950 LDA £13 \ newline to printer
960 JSR wrch_to_printer
970 LDA £0 \ Set Y back to zero
980 STA block +2
990 STA block +3
1000 LDA block
1010 CLC
1020 ADC £24 \ increase X by 24 ( from end of one
1030 STA block \ byte to start of next)
1040 LDA block +1
1050 ADC £0
1060 STA block +1
1070 CMP £5
1080 BEQ end_of_dump \ X has reached max value also
1090 JMP loop1
1100 end_of_dump
1110 LDA £27
1120 JSR wrch_to_printer
1130 LDA £19 \ back to 10 cpi monospaced mode
1140 JSR wrch_to_printer
1150 LDA £12 \ form feed
1160 JSR wrch_to_printer
1170 LDA £3 \ disable printer
1180 JSR oswrch
1190 LDA £7 \ bleep
1200 JMP oswrch \ Thats all folks!!
1210
1220 wrch_to_printer
1230 PHA \ Store character on stack
1240 LDA £1 \ send character 1 - next byte
1250 JSR oswrch \ to printer only
1260 PLA \ Get it back
1270 JMP oswrch \ then back to calling routine
1280
1290 J
1300 NEXT pass
1310 END PRG

```



Spectrum games, £2 each, Jumping Jack, Blind Alley, Quicksilver, Invaders, 3D Desert Patrol. Send PO to: 25 Oxwich Rd, Mochdre, Colwyn Bay, Clwyd.

Oric software, Oric Forth £10, Dinky Kong, Digger, Harrier Attack, £5 each. The lot for £20. Tel: 0942 728161 after 4pm.

Atari 400 16K program recorder, Basic and Pilot Programming languages plus one joystick and lots of software all for £200. Tel: 582 3975.

Acorn Atom, 12K + 12K, regulated PSU, utility ROM, soft VDU, Peeko computer, Invaders cassettes, 3 Atom books, Price £90 ono. Tel: (0742) 655227 after 7pm.

Oric-1 48K boxed, under guarantee, as new. Several games, Ian Sinclair book, £120. 4 Park Mansions, Main Avenue, Moor Park, Northwood, Middx, HA6 2JH.

Acorn Atom 4K only £60, also cheap printer Olivetti TE300 Teleprinter ASCII punched tape I/O and RS232 (needs attention) £50. Tel: Crowthorne 771915 evgs.

Dragon 32, tape recorder, joysticks manual leads, plus 30 assorted cassettes incl. books, magazines, £200 ono Tel: 021-788 8693 after 6pm.

Oric-1 Forth by Tansoft for 48K Model for sale, original tape plus manual, £10 ono. Tel: Skelmersdale 26072 ask for Andrew.

Sharp MX-80K 48K RAM, beautiful condition, as new, complete with cover and selection of software, over £400 new, only £225. Tel: Padgate (Warrington) 816624.

TRS-80 +32K Interface + Monitor + 3 double density disk drives, +software including Visicalc, Profile and Editor Assembler. Excellent condition £950 ono. Tel: Dave Milburn 01-928 1777 X4110 daytime.

Osborne 01 with software worth £800, Epson FX80 matrix printer, manuals, paper, disks, wordstar, supercalc, suit small business or writer. Allen 01-724 3681. £1200 ono.

Apple software, Arcade/adventure games, utilities, business-Visicalc, Applewriter, dBase II, Cobol, Wordstar/Spellstar/Mailmerge. Full list. SAE please, J Davey, 44, Hazelmere Road, Stevenage, Herts.

Vic 20 16K RAM, 9 months old, 25 games on cassette and cartridge, excellent condition for quick sale, £125. Tel: 01-881 1758 eve, after 7.30.

Spectrum software wanted, Original with cassette slip, all types, will collect and pay cash for large quality collections only. Tel: (London) 01-520 0904 with details.

PCN Billboard

Commodore 64 software. A simple word processor on tape or disk, output to 1520 etc, £10 tape, £12 disk. 66 Gainsborough, Bracknell, R612 4WL.

Sharp M280K disk drives, I/O box, disk interface, printer interface, Ardensoft tool kit, word processor, £450. Tel: 01-723/1547 (London).

Wanted: Spectrum and Commodore 64 software. Originals only. Top prices paid. Please submit SAE and list to Upper Shortlands, Wedmore, Somerset.

Atan 822 printer, no interface needed, plus three rolls of thermal paper, £100. Also various cartridges, £12.50 each. Tel: 01-674 5809 evenings.

Microplus S100 disc controller board, £15. UK101 expanded cased, £80. S100 backplane, offers. 8086 development chip set/monitor. ROM's, offers. Tel: Hugh Bridge, 01-735 1862.

Texas TI99/4A computer, speech synthesizer, extended Basic, cassette lead, eight cartridges including Parsec, Munchman, Invaders, Adventure, various games cassettes, £250 ono. Tel: Crayford 56645.

Spectrum software to sell. Christmas bargains! Abersoft Forth (cassette) £10. Heathrow ATC, £5. Hobbit, £8. VU3D, £6 or £25 the lot. Tel: Chris on Rugby 832468.

VIC-20 software. Vi-Calc, Adventure cartridge: The Count. Cassette: Magic Mirror, Werewolf Curse, £5 each or all four for £15. Contact Paul on (0455) 637427.

Swap or sell. BBC Micro Software, Snapper, Vortex, Croaker, Chess, etc. 15 original tapes. Tel: John, Romford 63638 between 6 and 7 pm.

SWAP Spectrum software, loads to choose from. Hobbit, Manic Miner, Jetman, Atic Attack. Loads more to choose from. Tel: 051-226 7963 after 6pm and ask for Ray.

BBC disk drive, 100K, SS/DD plus tons of software. Want only £195. Tel: 01-574 4122 between 7-9pm.

ZX81, 16K, complete in box, magazines, books, £60 of software, guaranteed until 14/5/84. Ring Havant 482700 after 5pm. Worth over £130, open to offers.

Wanted. Valforth language for the Atari I 400/800, plus set of utilities and manuals, good price paid. Tel: Grant on (0309) 73694.

For sale. 16K ZX81, typewriter keyboard and over £90-worth of software. Tel: 01-267 5295 between 2pm and 10pm.

BBC DFS 0.90, £10. Security Eprom, £10. Both with fitting instructions. Mrs Lynda Openshaw, 44 Brierley Street, Bury, Lancs.

Epson HX-20, Microcassette, case, cost £559 (inc. VAT), only one year old, hardly used. Yours for only £400 (inc. VAT). Tel: Phil Bowles, 01-470 4183.

Atari VCS for sale. Plus 11 cartridges, joysticks and paddles, only £170. Tel: 01-889 9887 evenings.

Oric-1 48K. With leads, demonstration tape, manual and Oric-1 book. Excellent condition. Still under guarantee. Only £105. Tel: (0705) 585609.

96K LYNX. One month old, guaranteed. Plus Pac-Man; Monsterrmine. Tapes including all leads, two manuals, excellent condition, bargain at £260. Tel: 061-881 4018 after 5pm.

Spectrum software. Wanted, originals only, top prices paid, any quantity. Send list plus SAE. S. Duckett, Upper Shortlands, Wedmore, Somerset.

TRS-80 +32K interface, monitor, 3 double density disk drives and software, including VisiCalc, Profile and Editor Assembler. Excellent condition, £850 ono. Tel: Dave Milburn on 01-928 1777, ext. 4110 daytime.

VIC-20, 16K expansion, QN cassette unit, joystick, programmers reference guide, £120 worth software, 30 magazines, vgc. All worth £315, accept £175 ono. Tel: Alan (0294) 64235 evenings.

Oric 1, 48K, complete manual, leads and software. Xenon I, Galaxians, Oricmon, Oric Owner magazines. All worth £180, sell for £125. Tel: Mehran on 01-429 0317 evenings.

2CN cassette recorder, Suitable for C64 or VIC-20, £30. Calc result 3D spread sheet, £89. Both hardly used. Tel: 01-952 2644 evenings.

Swap Spectrum software, including Manic Miner, Atic, Atac, Scrabble, Lunar Jetman and over ten of top thirty. Tel: Bloxwich 409552.

48K Spectrum + tape deck and mags and 46 games, including Jet Pac, Manicminder, Penetrator, Time Gate, Football Manager, etc. All for £200. Tel: 01-203 0902, Damian.

Sharp M280A, 48K micro computer, complete with monitor and integral cassette deck. Excellent condition. Boxed as new, hardly used. £250. Tel: Guildford (0483) 232253.

Oric version of The Hobbit, complete with book. Only £10. Tel: Barnsley (0226) 43071 and ask for Antony.

Spectrum software. Scramble, Gulpman, tape copier, Invaders, Golf, all £3.50. Black Crystal, Automonopoli, Spectres, £5. Forth, £10. Excellent condition. Write to M. Groll, 31 Armitage Lane, Brereton, Rugeley, Staffs.

For Sale. Lynx 48K Micro, £155 ono. Immaculate condition, still in box. All manuals, leads. User mags and games. Ian Paton, 39 Yates Street, Liverpool L86RD.

Spectrum DK trionics light pen for sale, five months old, hardly touched, still in box. Cost me £20, sell for £12. Tel: 01-790 7777. Stepney, London E1.

Wanted: Dragon 32, users in the Southampton to Salisbury area for pen-pals. Write to Ashley R. Adamson, St. Elmo, Slab Lane, West Wellow, Romsey, Hants SO5 0BY.

Wanted: Memotech keyboard and buffer pack for ZX81. Must be in perfect condition. J. Moffett, 121 Knockbreda Park, Belfast BT6 0HE. Tel: (0232) 640075.

Wanted: Spectrum software. All types collected, makers originals with cassette, slips only, cash offer and collected (London area). Tel: details please 01-520 0904.

Dragon 32 boxed. Plus leads, £300-worth software, books. For £195 ono. Also T1994A, boxed, guaranteed, £60 software, joysticks, leads, £130 ono. Tel: (0254) 672068 after 5pm.

Dragon 32, four months old, replacement, plus joysticks, games on cassettes, cartridges, magazines, one years' insurance, immaculate condition, boxed, as new, only £150 ono. Tel: 01-570 8783.

Atari software, 400 800, 600XL, brand new, unwanted Christmas surprise, large list. SAE for details, 27 Crawford Gardens, St. Andrews, Fife KY16 8XQ. Tel: (0334) 75817.

Commodore 64, Still guaranteed, £185, complete with box, manual. Would like to exchange Atari 600XL with cassette, must still be under guarantee. Tel: Southampton 437369.

Golf cartridge for sale or swap. Also willing to swap other Atari software. Tel: Mark on (0495) 247328 anytime.

Sharp M280K software, 22 cassettes and book for sale, only £40 the lot. Includes user notes. Tel: John, 01-472 1331 after 6pm.

48K Oric, as new, boxed, plus printer cable. £100. Tel: 01-841 1815.

Commodore 3032 (32K), dual disk drives and printer. All vgc. Also assembler software and all cables, £925 ono. Tel: Brighton (0273) 771577.

BBC B + DFS new, boxed, complete with all leads and two Acornsoft games, bargain at £200, must sell moving country. Tel: Oxford 64039 after 8pm. (James).

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Acorn checks out in chess

Well, Acorn got it half wrong. Using the 'precocious' (Acorn's word) BBC micro it almost predicted the outcome of the World Chess Championship semi-finals.

In the first semi-final its probability ratings were Kasparov (youthful genius and hero of the Russian people) 89 per cent, Korchnoi (ageing defector, enemy of the Russian people) 11 per cent. In the event Acorn nearly came a major cropper.

Korchnoi took an early lead but Kasparov clawed his way back to finally overhaul his experienced opponent.

In the other semi-final Acorn had the competitors more evenly matched and ended up predicting the wrong winner. Its ratings were Zoltan Ribli (rising star from Hungary) 60 per cent, Vassily Smyslov (Russian veteran) 40 per cent.

As it turned out experience triumphed over youth and Smyslov had a relatively easy win.



Pull the cord

Furniture makers are among the unsung heroes of the micro revolution. While we find ever more ways to damage our health with advanced technology, the tireless upholsterers are

beavering away to keep us fit.

Prayer has nothing to do with it, whatever you might think of the photo. It's all a question of posture. On these remarkable chairs slouching is physically impossible — as the diagram so graphically demonstrates.

NEXT WEEK

Hitachi hit? A full Pro-Test of Hitachi's new and colourful PC.

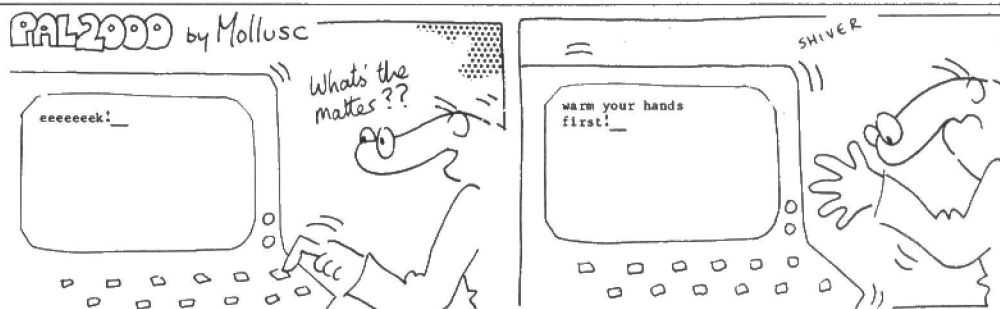
Jet propelled PCN puts the Integrex Colourjet printer through its paces.

Electron II The second part of our pull-out-and-keep guide to the Electron.

64 Basic Taking stock of a Basic compiler for Commodore's 64.

In focus Peripherals move centre stage in the Databasics section.

Gameplay Reviews of games for the Dragon 32, Commodore 64 and Vic 20.



PCN DATELINES

PCN Datelines keeps you in touch with up-coming events. Make sure you enter them in your diary.

Organisers who would like details of coming events included in

PCN Datelines should send the information at least one month before the event. Write to PCN Datelines, Personal Computer News, 62 Oxford Street, London W1A 2HG.

UK EVENTS

Event	Dates	Venue	Organisers
Which Computer? Show	January 17-20	NEC, Birmingham	Clapp & Poliak Europe Ltd., 01-747 3131
Northern Home Entertainment Show	January 19-22	Excelsior Hotel, Manchester Airport	Stamley Wire Advertising Ltd., 01-253 6637
Acorn Education Exhibition	January 25-27	Central Hall, Westminster	Computer Marketplace (Exhibitions) Ltd, 01-930 1612
Peripherals Suppliers	January 31-February 2	Cunard International	Reed Exhibitions, 01-643 8040
Communications & Computer Systems Fair — CABLES	February 2-4	Pontin's, Prestatyn, Wales	Pontin's Ltd., 07456 2267
London Home Computer Show	February 3-5	Royal Horticultural Society's Old Hall, Westminster, SW1	Andy Jones, 0562 751126
10th ZX Microfair	February 4	Alexandra Palace, N22	Mike Johnstone, 801 9172
The Apricot & Sirius Show	February 7-9	Kensington & Chelsea Town Hall	Dennis Jarrett, 241 2448
Taunton YMCA Computer Exhibition	February 11	Taunton YMCA, Somerset	P. Wojeik, 0823 74667
LET '84	February 13-15	Heathrow Penta Hotel	Anthony Farrar, 0923 774262
International Home Computers, Video Games & Software Exhibition	February 13-15	Heathrow Penta	Wheatland Journals Ltd., 0923 774262
Information Technology & Office Automation Exhibition and Conference	February 21-24	Barbican Centre, London EC1	B.E.D. Exhibitions Ltd., 01-647 1001
OEM Only Conference	March 7	Hilton Hotel, London W1	Tom Lewis, 01-994 6477
Computer Trade Show	March 13-15	Wembley Conference Centre, Middlesex	Reed Exhibitions, 01-643 8040

OVERSEAS EVENTS

Event	Dates	Venue	Organisers
International Winter Consumer Electronics Show 22-25	January 6-10	Las Vegas, USA	Consumer Electronics Shows, Chicago, 0101 312 861 1040
National Software Show (East)	February 3-5	Miami Beach, Florida, USA	Raging Bull, USA, 0101 415 459063
Personal Business Computer Show	February 29-March 3	Hong Kong	Overseas Exhibition Services Ltd., 01-486 1951

BUG-BYTE SOFTWARE



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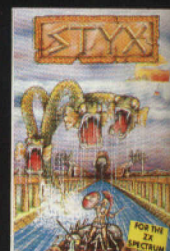
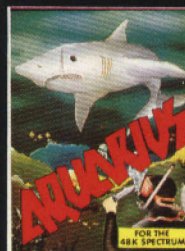


ALERT..ALERT..ALIEN..FORCES
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ARE..PLANNING..TO..ATTACK..
AND..DESTROY..WATFORD
..THEY..MUST..BE..STOPPED.....

The sub-space communicator crackles briefly, then goes quiet. You type in the co-ordinates of the planet into your hyperdrive and hit the activate button. As the stars turn into white streaks, you think back to the last encounter with the forces of Zragg, the deadly caverns, the automatic missiles, the precious fuel dumps, the cavern guardians, the asteroids, but most of all, the treacherous maze.

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